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THE TEACHER'S HANDBOOK OF PSYCHOLOGY

BY

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PREFACE TO FIFTH EDITION.

In the present edition the *Handbook* has been revised throughout, and to a large extent re-written. It is now between one-sixth and one-fifth larger than it was in the fourth edition. The additions include some chapters which are wholly new, namely, i., xv., xvi., xvii. and xx. Other chapters—more particularly, ii., iv., vi., vii., viii., ix., x., xii., xiii., xiv., xviii. and xix.—have undergone so much alteration as to be largely new. In making these changes I have sought, while keeping to the original form and mode of treatment of the book, as well as to its original intention—as an introduction to psychology—to make it more adequately representative of the present state of psychology and of educational thought. As a result of the changes the work will be found somewhat more advanced in parts. Any difficulties thus introduced, however, may be considerably lessened by a study of the book under the guidance of a competent lecturer, who may probably advise the student to omit certain portions on a first reading: *e.g.*, on the theory of Development, and on Perception. In this way, I trust, a work which has so long kept its place in the department of educational psychology may continue to be a useful introduction to the subject—primarily for teachers, and secondarily for others who in the past have found it serviceable.

The state of my health, together with other obstacles, has prevented my carrying out unaided the whole of the revision. The chapters revised by myself alone are i., xv., xvi., xvii. and xx. In recasting the others I have been assisted by younger men. Chapters ii. to x. have been revised by my son, Mr. Clifford Sully, B.A. (Cantab. and Lond.), and nearly all that is new in them has been contributed by him. I regret that I had here and there to shorten, and to alter the form of, his additions. The alterations in the chapters on Imagination and Thought (xi.-xiv.), are largely the work of Mr. L. Curtis, M.A. (Cantab.), and those in the chapters on Conation (xviii., xix.), of Mr. W. H. A. Dockerill, M.A. (Cantab.); and I owe these gentlemen more than an ordinary debt of gratitude for their timely and valuable assistance.

Generous aid has been given me in seeing the book through the press. My old friend and successor in office, Professor Carveth Read, and my friend and former pupil, Dr. Hubert Foston, have read the whole of the proofs and suggested many improvements. Among others who have helped me with valuable suggestions are Miss Amy Kimpster, of the University College of Wales, Aberystwyth, Professor W. McDougall, of Oxford, Mr. W. H. Winch, M.A. (Cantab.), Honorary Treasurer of the British Psychological Society, and Mr. W. Brown, M.A. (Oxon.), Lecturer on Psychology at King's College, London. In preparing the Bibliography I have had the kind co-operation of Dr. Nunn, of the London Day Training College, of Miss Alice Woods, of the Maria Grey Training College, of Miss Amy Kimpster, and of M. Gabriel Compayré, Membre de l'Institut, and Inspecteur général de l'Instruction publique.

RICHMOND, SURREY.

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PART I.

MIND AND ITS DEVELOPMENT.

CHAPTER I.

INTRODUCTORY.

(A) What is Psychology?

Common and Scientific Knowledge of Mind. Psychology is a scientific account of our mental processes. It investigates such familiar experiences as our recollections, our feelings of sorrow and joy, and our resolutions.

Like other branches of science it has grown out of a looser and less exact form of knowledge, our common practical knowledge. Long before there was a science of mind men had learned to distinguish and name most of its important operations. Educated men and women to-day, who know nothing of psychology, in their everyday converse describe and even offer some kind of explanation of their likes and dislikes, their beliefs and so forth. Psychology starts with this common knowledge and seeks to improve upon it by introducing more exact methods of study. In very much the same way as physiology renders our everyday knowledge of a muscular movement more precise by bringing to light finer processes in muscular and nervous fibres, psychology seeks to probe our mental processes, *e.g.*, our perceptions, our emotions, so as to get at the more elementary constituent processes.

The Peculiarities of Psychological Study. Psychology has no peculiar scientific method. It adopts the methods of the natural sciences, chemistry, biology, etc., namely, that of accurately observing, classifying and explaining facts belonging to a particular group. On the other hand,

it is marked off in an unmistakable manner from the other sciences by the speciality of its subject-matter, which imposes a peculiar attitude of mind on the investigator. It is one thing to observe through the senses aided by artificial lenses a bit of minute organic structure, quite another thing to scrutinise an invisible thought or feeling.

Every psychological fact is the experience of some one, of myself or of some other person. This is clearly implied in our everyday language, "*I* feel glad," "Do *you* think?" and so forth. Psychology recognises this reference to some self or ego, though it leaves the question "What is this Ego?" to another branch of inquiry, to philosophy.

Again, since psychology is a science, it tries to get at the general form of a mental process, to determine the common pattern of everybody's thinking, feeling and the rest. Hence it does not concern itself with the question, "What particular person's experiences are we dealing with?" At the same time it seeks to throw light on the more important modifications which these typical forms of process undergo in the case of different persons.

How we Obtain our Psychological Facts. Two main directions disclose themselves in psychological inquiry, which, indeed, are fully recognised in everyday language. (1) One can observe his own mind, which is obviously nearest to him and most accessible. (2) One can, further, study other minds than his own, that of a child, for example. It is evident, however, that in the second case we go another way to work. As we shall see presently, we do not in this case *observe* mental processes at all, but infer their occurrence from certain external signs. We have thus two ways of approaching minds: (*a*) *The Direct mode of Observation* and (*b*) *The Indirect mode of Interpretation.*

(*a*) **Introspection.** The mode of direct observation is the first and fundamental branch of investigation in psychology. It is technically known as Introspection. Only by it can we get into touch with the living processes of mind. I should have no real knowledge of even so simple

a process as the discomfort of cold feet, or of a gnawing hunger, had I not acquired it at first hand by observing my own sensations. It is true in a peculiar sense in the case of psychology that knowledge must be based on personal experience.

As has just been implied, we all introspect in a manner. Some persons who do not study psychology introspect a good deal, inspecting their feelings, their beliefs and what not. The introspection which the psychologist carries out is a much more difficult operation than this. Skill in it has to be acquired by special training. Its chief difficulty arises from the circumstance that the same person has at once to be observer and observed: that when I inspect, for example, the successive phases of an emotion of joy or of grief, I must at the same time be having an experience more or less agitating, and coolly watching this experience. The difficulty is, however, surmounted in practice by acquiring a kind of trick, not unlike that of a juggler, namely, of carrying on two operations concurrently. Some enthusiasts have so mastered the art of glancing swiftly but effectively at their mental states even when these are agitating that they are able to observe their experiences when undergoing a painful surgical operation.

The Student to Practise Introspection. Some first-hand knowledge of facts and methods of inquiry is desirable in the study of any science; and the art of introspective inquiry must be acquired to some extent by all who desire to realise clearly what the psychological lecturer or textbook describes. The scope for verifying what he reads by direct appeal to his own experience is indeed particularly wide in the case of psychology, and gives to the study of it one of its chief advantages. The practice of this introspection, moreover, adds much to the interest of a subject which at first sight is apt to look dismally abstract. Many curious unanswered questions face the student, and he will find it interesting to try to answer them by an appeal to his own mental experiences.

The more fundamental part of psychology has to be

constructed by means of introspective *research*. This means a methodical analysis of complex processes, such as an act of recollection, an emotion, into their elements. This work of analysis has to be carried out again and again by different investigators, the results compared and criticised, until a generally accepted theory of the process is reached. In close connection with this analysis there goes the classification of mental processes under a few principal types, and the determination of those causal connections between process and process by which we account for them.

(*b*) **Connection between Mental and Bodily Processes: Indirect Study of Mind.** Now all this introspective work has to do with mental processes considered as detached from other sorts of occurrence. But a moment's thought will show us that mental events do not stand thus isolated from other events. Our feelings, our strivings, even our thoughts, are accompanied by, and express themselves in, certain bodily changes. Even a slight effort of thought may make its existence known to a finely measuring instrument, by slight motor impulses sent down from the brain to the muscles. Modern physiological psychology regards every mental process as immediately accompanied by certain nervous processes in the higher centres of the brain. In other words, it tells us that every mental event is a *psycho-physical process*.

It is this connection between mental and bodily processes which makes possible the indirect mode of studying the mental processes of others by interpreting the external manifestations of their thoughts and feelings. Whenever, as the result of our own experience, an external movement or other bodily change has become associated with a particular kind of feeling, we are apt to infer from the appearance of a similar bodily change in another that he is the subject of a similar experience. In this way, for example, we infer from a blush on a person's cheek that he feels self-conscious, or from a particular kind of cry that he is suffering pain. Nor in carrying out this familiar

everyday mode of interpretation do we reflect on the possibilities of misapprehension which lurk in it. As social intercourse depends on it, we have to carry it out almost instinctively. Indeed, owing to its practical necessity, the art of quickly interpreting the facial and other signs of changing moods in others, *e.g.*, the tribal chief or the marital lord, must have reached some degree of skill ages before young persons begin to torment themselves by inquiring introspectively into the nature of their own feelings towards others. Nevertheless, for scientific purposes this easy instinctive way of divining another's thoughts or dispositions must be pronounced almost worthless. In truth good trustworthy accounts of the mental processes of others which differ widely from our own, such as the insane, savages, and children, are the result of a special and rare scientific endowment. To begin with, there must be a fine observation of external signs, which are apt to be inconspicuous and elusive. Such observation must be accompanied by an intelligent interpretation of what is seen or heard. This, again, presupposes a training in the introspective study of mental processes. As a German poet puts it in his well-known epigram:—

Willst du die Andern verstehen, blick in dein eigenes Herz.

("If you would understand others, look into your own heart.") Yet this is not enough. Indeed, in trying to apprehend unfamiliar types of mind we have to combat the tendency to project too much of ourselves into others. Not only the lover of animals, the biologist himself has been known hastily to attribute to them rudiments of thought and sentiment which are pretty certainly confined to man. To know how much is possible to the mind of an animal or of a child we need to know the limitations of its powers as fixed by the degree of complexity of its brain as well as by its experience.

Yet modern psychology makes a large use of this investigation of others' mental processes, and for good reasons. Introspective study is limited in its range. When we are

old enough to begin observing our mental processes, we find ourselves face to face with a highly complex state of things. Many processes which are really complex may appear to the introspective observer perfectly simple. Hence we may have to supplement self-observation by that of some simpler type of mind, for example, the child's.

Experiment in Psychology. Of late a good deal of experiment has been introduced into psychology. In a scientific experiment we ourselves bring about and control the phenomenon we wish to observe. Hence we can vary the conditions, and, as in the familiar experiment of the air-pump, see what difference is made by the removal of a condition. In psychology experiment often helps us to get below what seems to be a simple process to yet more simple elements. For example, the ingenious apparatus of the stereoscope enables us to demonstrate that our apparently simple process of perceiving a solid body is complex, involving a combination of two partially dissimilar retinal impressions. Psychological experiment, aided by special apparatus, has made our knowledge of many simpler mental processes more precise. It has brought the idea of measurement into the psychological domain, and more especially by measurement of very small intervals of time has thrown much new light on the way in which our mental processes vary.

But experiment in psychology, valuable as it has proved itself to be, is in its turn limited. It can aid us but little when we begin to inquire into the history of our minds, how the mental processes we now find in ourselves came to take on their particular forms. It can help us to analyse, it cannot help us to retrace the path of development.

In order to trace the past course of development of our thoughts, purposes, etc., we need to get away altogether from the adult type of mind and to search for examples of a simpler sort of mental experience. This we can do by studying what medical men tell us about cases of arrested development, and about the disturbing mental

effects of disease. Of very peculiar value to the psychologist are the records of defective types of mental life due to the absence of one or more of the higher senses. The more careful study in recent years of persons who have been blind from birth or early childhood has thrown much new light on the way in which normal persons acquire their perceptions of objects in space. The careful records kept of the mental progress of the two remarkable American women, Laura Bridgman and Helen Keller, are no less impressive as a contribution to science than as a story of indefatigable philanthropic effort (Note A).

Child-psychology: Conditions of the Study. Yet even the study of these partial simplifications of our common pattern of experience is not enough. We want to know how our own and all normal minds have developed. And since, however long the range of our recollection, no one of us can recall with the required clearness and completeness the experiences of his first years, there remains as the last resort of science the guidance of the "little child". If we can only decipher the mystic characters of a child's external behaviour, we may be able to approach at least the desired beginnings and to supplement our introspective with a genetic psychology.

Now this work of child-study is not an easy one which anybody can rashly take up. It requires, for one thing, special personal aptitudes and tastes, a warm interest in children, the preservation of a child-like spirit to which nothing childish is alien, and a quick sympathetic imagination. But what needs to be emphasised here is that these personal gifts are not everything, that they need to be accompanied and guarded by the caution bred of scientific reflection.

To begin with, to study a child's mind is to interpret the outward signs of mental processes. In the first years, at any rate, we can learn next to nothing from the child's own lips with respect to his impressions and feelings. We have to watch his movements and to do the best we can in interpreting what we see. In this interpretation of a

child's behaviour the natural bias to read our own mental habits into others' minds is ever at work and has to be vigorously resisted. The observer of the child must always be on his guard against the natural inclination to look out for more than one can reasonably expect, if not for marvels. He must set out with the knowledge of the "grown-up" type of mind and interpret all that he observes in the light of this knowledge; and yet he must always keep in view the real and profound differences between his developed mind and the undeveloped mind which he is studying. It is evident that so difficult a work demands in the worker something more than introspective knowledge. There is needed for one thing some general knowledge of how children behave. This means that in addition to the knowledge gained by introspection, he must have a general knowledge of the characteristics of the young mind, as well as of the undeveloped condition of a child's brain.

Lines of Recent Work in Child-study. The difficulties of this line of research and the very special qualifications required for it are fully illustrated in the new branch of study variously known as child-study, child-psychology, or pædology. We will begin with the more scientific portion of this work, the continuous and methodical observation of a child during the first three years of life. The well-known work of Preyer, with which that of Miss Shinn may fitly be associated, as well as some other observations of the first stages of speech-development, are models of what scientific work should be: examples at once of fine accurate observation, and of judicious interpretation.

Next to this study of the first three years, one may instance much of the experimental work carried out on school children, such as the precise measurement of sensory and motor abilities at different stages of development. One of the most fruitful of these experimental investigations has been directed to the more precise study of mental fatigue, *i.e.*, the temporary loss of mental power due to work recently done, and of the rapidity of recovery from such fatigue. Some of the simple written exercises, too, by

which children have been led, without fully understanding the experimenter's intention, to disclose their customary ways of conceiving objects, the predominant directions of their thought and their preferences, have certainly added to our knowledge of the characteristics of the child's mind.

Weak Points in Child-study. On the other hand, much of the recent child-study which proceeds by questioning children and young persons generally can hardly claim a place in child-psychology, properly so called. It may be interesting and valuable as supplying a rough verification of our theories and as suggesting new hypotheses. Yet it is at present in too loose a form to be of any scientific value. The collection of a large number of answers to certain questions—the *questionnaire* method —which is chiefly followed in these inquiries, is beset with dangers. Even when definite answers are obtained from children, our attempts to get at their mental contents are likely to be frustrated by the circumstance that we may unknowingly by our inquiries set up an unnatural attitude of mind, arousing, for example, a self-feeling—a consciousness of one's own importance—or a semi-conscious wish to give us the kind of answer which they think we should like. In many of these statistical inquiries, moreover, a certain amount of introspective work is imposed on a young mind wholly untrained in this difficult art, and, we may add, likely to suffer morally by being required to carry it out. If, on the other hand, the inquiries are answered by young persons who have emerged from the state of childhood, we have, it is clear, to do with all the uncertainties of memory.

Child-study must be Quiet and Patient. The investigator who has something of the scientific spirit will not be discouraged by these difficulties. He will not expect so difficult a branch of inquiry as child-psychology to shape itself satisfactorily within a few years. "Try and try again" must be our procedure here as elsewhere before the best methods are clearly formulated. One little forecast may be added: that in the child-study of the future

more attention will be given to the art of waylaying and capturing a child's mind without his suspecting our purpose. This will require the supplementing of the more artificial measures of the experimenter by much quiet passive observation. The child does not naturally hide himself but is frank and open. He will reveal himself spontaneously and generously to one whom he trusts and loves. Our best and surest way of reaching his real self is to sit patiently and watch him with undisturbing eye, as in his prattle, his play, his crude drawings and other modes of self-expression, he spontaneously discloses his thoughts, fancies and wishes.

Aids to Child Psychology: (*a*) Biological Point of View. In thus abandoning the point of view of adult introspection and studying the earlier stages of our mental life as they disclose themselves in the child, we find ourselves compelled to call in the aid of other sciences besides psychology. In order to understand much in a child we must place ourselves at the biological point of view as defined by the modern doctrine of evolution. For example, when studying the child, we find ourselves face to face with instincts, such as play and outbursts of passion, which clearly show his kinship with the lower animals. More definite traces of habits of ape-like ancestors exhibit themselves just after birth.[1] The question of how much the child inherits from lower levels of human and animal evolution will force itself on the attention of a serious student of child-psychology. Not only so, in dealing with the child's mind and its development, we may, with advantage, adopt the view that his conscious actions are higher forms of those adaptations of organism to environment by which the life of all organisms is preserved. The child is in truth, among other things, an organism striving to preserve itself; and his conscious actions, as when he shuns a stranger or strikes back on being struck, may be viewed as the self-preserving *functional* activities of his organism.

[1] See W. B. Drummond, *Introduction to Child-Study*, pp. 52, 53.

(*b*) **Human Point of View.** Yet the biological point of view will take us only a little way in our interpretation of the child's actions. From the outset he is more than an animal: he is human. He shows himself to be such in the inheritance of certain distinctively human tendencies, *e.g.*, disinterested curiosity about things in general, an impulse towards self-development which gradually grows distinct as a conscious ambition to know about things, to grow strong and skilful in action and so forth.

We see this element of congenital humanity, too, in the fact that a child is subject to a Human Environment, that through his social impulses, imitation and the rest, he strives to assimilate the fruits of human progress as they are conserved in the language, the knowledge, the moral standard of his age. Indeed we cannot give an adequate psychological account of the growth of a child's intelligence —not to speak of his moral attributes—without a good deal of direct reference to the constant action on his unformed mind and character of this human or social environment.

(B) How Psychology Bears on Education.

The End of Education. Education is an art, and as such needs to have a clear idea of its end. We cannot begin to educate intelligently until we know what we are aiming at. Any error in our way of conceiving the end will mar our whole plan of education. Thus the narrow "utilitarian" idea which conceives of education as a direct preparation of the child for his particular life-career has tended and still tends to vitiate the whole of educational theory and practice.

The end of education, that is the general education which is desirable for all members of a highly civilised community, is plainly something large and complex. We cannot decide what it is without considering what is meant by a fully developed personality, including a healthy and efficient body and a mature mind and character; and how the development of these valuable human qualities is related both to

the attainment of a full energetic and happy life by the individual and to his fitness for social and civic life. In order to define the end, therefore, we have to go to Ethics which is a Normative science, that is to say, one dealing, not with what actually exists, but with what is desirable, and defines for us the elements of highest value in personality and character. The aid which Ethics is fitted to give to one who thinks about education by its scientific treatment of our ideal conceptions, and more particularly of a perfectly wise man, good man, and cultured man, is invaluable. Other sciences assist in this definition of our educational end. Thus the new science of Sociology helps Ethics by giving a more precise idea of a sociably efficient person. Again, Logic assists by determining the conditions of accurate reasoning, and Æsthetics by determining what is really beautiful, and by supplying criteria, by the application of which our tastes in the things of literature and the other arts can be shown to be good or bad.

One characteristic of the end of education as thus defined needs to be emphasised. In dealing with the development of what is good and valuable in human nature we are concerned with living processes which are ever changing and advancing in complexity. Hence, to conceive of our educational end as a finished off and fixed product, like the statue which the sculptor's art achieves, is a profound error. The intelligent, refined and good person which the educator helps to develop is a progressively realisable ideal, of which only the lower stages can be reached by the time that the school and the college have done their work. Education has to prepare for further processes of progressive self-realisation in later years. It is a ghastly failure if it does not lead on to the work of *self-education*, not merely that involved in developing the special knowledge and aptitude required by the particular career followed, but that which carries further, widening and deepening, the results of the whole of the school and other education of the early years.

Process of Education. When we have a clear idea of the end of our art we may proceed to inquire by what

agencies or means we can best hope to realise this end. Some knowledge of these agencies is involved in any practice of an art. But when the art is in its earlier and cruder stage, a merely practical or empirical knowledge of the *modus operandi* suffices. Thus, when among uncivilised tribes education consisted merely in training the hunter and fighter, a very little traditional knowledge was sufficient. But now that the art aims at a large many-sided result it needs the guidance of another and higher kind of knowledge, namely, scientific knowledge. Since every educator is concerned with maintaining the bodily health and vigour of his pupils, he will of course seek guidance from the science of physiology and its practical applications in hygiene. But in all the higher work of mental and moral training he must look to psychology.

How Psychology Illumines Educational Work. This relation of psychology to education is so close and so apparent that in speaking of their work pedagogues have always introduced a sort of psychology, though like M. Jourdain they may have been quite unaware of the fact. A mythological kind of psychology peeps out in the old scholastic doctrine that boys are possessed by an evil spirit, to exorcise which the cane is the proper instrument. The teacher has done his best, too, to appropriate the later doctrine that the mind is a number of quite separate and isolated faculties, memory, imagination, will and the rest.[1]

The relation of psychology to education has been made growingly clear in modern writings on the subject, from those of Locke to those of Herbart and more recent thinkers. Psychology is indeed needed as a handmaid to Ethics in rendering clear the idea of our goal—of all that is comprised in a completely developed mind. But it is needed still more in understanding our starting-point, the child, on whose rudimentary impulses and aptitudes our educative work has to act. It is needed further for any clear thinking out of the processes of teaching. It has

[1] This doctrine will be referred to again later.

been said by a shrewd American writer that "while the pupil thinks the object under consideration, the teacher thinks the pupil's process of thinking the object".[1] Clearly then, he needs to have the fullest knowledge of these mental processes of his pupils, and he needs psychological light in planning the successive stages of his educative work so as to adapt them to growing mental powers. With regard to the higher phases of mental development, it is sufficient to point out that the educative action of the human environment is a necessary factor in the process: the child develops into a full manhood only through education; so that the connection between education and psychology here becomes a peculiarly close one.

A vital point in this bearing of psychology on education is that the adequate grasp of it delivers us from the old unscientific view of our work as a kind of mechanical action. From the point of view of modern psychology the educator may smile at the old-fashioned talk of *moulding* the plastic substance of the young mind and character, of *stamping* impressions on the tablets of the memory and so forth. In these days there is no excuse for forgetting that the child is a living organism which grows by the exercise of its own functional activity; and that the work of the educator is to excite and to direct this activity in the way most favourable to a sound and complete development of mind.

To the knowledge of psychology, in the ordinary meaning of the term, namely, the science of the processes of the individual mind, teachers should add some study of the new science of "Social Psychology," which treats of the collective mind of a community, of how individuals interact one upon another in social life, and how collective sentiments, opinions, etc., are formed. The schoolmaster has to control, and to act beneficially on, the collective mind of his school; and in order to do so intelligently he must know something of the way in which

[1] A. Tompkins, *The Philosophy of Teaching*, p. 5.

the common opinions, tastes and moral tone of a social group grow and are modified by controlling influences. Even a friendship between two boys is more than a fact of individual psychology, it is a social fact, involving interaction between two minds and characters. And a sentiment running through a school is a complex social fact involving many such interactions. The teacher aims ultimately at developing intelligent and good individuals; but this aim is realised in part by means of a favourable social medium or atmosphere, upon which, as ruler and guide, he can powerfully act. But further, though the school community is a temporary one, in the sense that its individual members remain only a few years under its influence, it is, in its system of organised work, its government, etc., a microcosm which imitates and prepares for the macrocosm or larger community, into which every pupil passes on leaving the smaller one.[1]

Why the Teacher should Study Psychology. Yet though psychology is necessary to a theory of education, it does not follow that teachers should directly study the science. It is urged by some that it is better to work out its principles into a more practical form—a theory of education or *Erziehungslehre*—and make this the subject of study for the teacher. The tendency seems, however, at present to require of the teacher some direct study of the science itself. The objection to this plan, which used to be confined to head-masters and other "practical" persons, has curiously enough been taken up of late by two eminent American representatives of the science itself, Prof. Hugo Münsterberg and Prof. W. James.[2] When cleared of a certain obscurity of language their view appears to be

[1] Among the works dealing with social psychology we may cite the well-known work of Tarde, *Les Lois de l'Imitation*, Le Bon's volume, *The Crowd*, Mark Baldwin's *Social and Ethical Interpretations in Mental Development*; and, more recently, W. McDougall's *Social Psychology*, and E. A. Ross's *Social Psychology*. The educational bearings are dealt with by A. Tompkins in his little book, *The Philosophy of School Management*.

[2] H. Münsterberg, *Psychology and Life*, chap. iii.; W. James, *Talks to Teachers*, chap. i.

reducible to two by no means alarming propositions: (*a*) Psychology is not all that is needed by the teacher; (*b*) all parts of psychology are not of equal importance to him.

Under (*a*) we have a new emphasis laid on the headmaster's favourite dictum—which if Latinised (as it perhaps deserves to be) would run: *magister nascitur non fit*. This attempt to assimilate the schoolmaster to the poet does not, however, call for serious consideration. It may suffice to take a closer analogue of the educator, and to ask what would be thought of a medical man who proposed to drop the study of anatomy and the other sciences of his profession on the ground that scientific training alone will not make the successful physician. A good deal of special endowment, a certain sympathy and tact, a strongly *suggestive* personality, as well as much practical knowledge are necessary both for the teacher and for the physician; and in neither case does the fact in the least affect the validity of the demand for scientific training as well.

The other point emphasised in the cry "psychology is not everything," is "that the teacher's attitude towards the child, being concrete and ethical, is positively opposed to the psychological observer's, which is abstract and analytic".[1] The opposition here asserted is by no means self-evident. Psychology is not wholly abstract and analytic. As urged above, it gives a theoretic view of the mind *as a whole*, in its connected phases and stages of development. The ethical end itself, viewed as realisable by the individual's efforts of will, comes into psychology, appearing here in its complementary psychological form, as the motive to action. Indeed, just because it deals with all development, psychology is bound to lay special stress on the chain of conscious efforts by which each of us reaches, if at all, the higher levels of a full and harmonious mental life. Yet while urging this we may recognise and em-

[1] In this way W. James epitomises the contention of Münsterberg, *Talks*, p. 13.

phasise the importance of the ethical point of view in educational work. The young teacher must certainly be on his guard against the tendency to think that psychology by itself can give him a complete theory of his work. As a positive science knowing nothing of ends or values, psychology lends itself with a cold impartiality to all sorts of training of the young from the noblest kind of "making" to the worst kind of "marring". It is only the clear steady vision of our end which can make us apply psychology in such a way as to become true educators.

(*b*) The second objection, that all parts of psychology are not of equal value to the teacher, has a certain force. For example, much of the more technical work of the psychological laboratory, which has to do with a few comparatively restricted and more or less artificially induced mental processes, is best let alone: so, too, the more speculative parts of the science, such as the definition of the subconscious and its relation to consciousness. On the other hand, some knowledge of the whole subject is certainly desirable. Even if, as used to be thought, the teacher is concerned only with the processes of acquiring and reproducing knowledge, he will find that he must study more than the intellectual side of his pupil's mind, since feeling in the shape of interest, and will in the shape of an effort to think, both enter into the processes of learning. And it may be hoped that we of to-day regard education as much more than teaching, in the narrow sense of this word, as an orderly development of all the powers of the mind.

How the Teacher is to Study Psychology. In studying psychology a teacher must begin with an introspective observation of the more developed forms of mental process. And this partly because such study is, as we have seen, the fundamental part of the science. Like other students, he must get to know the precise nature of a process of recollection or of reasoning first of all by directly observing it in his own mind. Nor is this really, as it might seem,

beginning at the wrong end. The first thing a teacher has to get a clear idea of is his aim; and as pointed out above, we cannot think clearly about the sort of intelligence and character we wish to develop without a clear psychological comprehension of the later and maturer forms of mental process.

After a short course in general psychology the special problems of child-psychology can be approached with advantage. Of the importance of this to the teacher it is unnecessary to speak. It is indeed too interesting and, one may add, too amusing to the student to be in much danger of being considered unimportant. It has established its place in the training college (Note B). If it be objected that some of the best of the work in child-psychology has to do with infancy, and so with a state of things much more simple than that which the teacher of young children has to confront, it must be remembered that it is *the processes and laws of development* which a teacher is most concerned to know, and that these can best be studied in the early stages of infancy.

In this study of child-psychology, too, the teacher should be encouraged to observe and interpret for himself. Indeed it may be urged with reason that the course of study in a training college should include a piece of methodical work in observing and recording some facts in child-life, *e.g.*, a study of the characteristics of some individual child, or of two children contrasting in temperament, etc., or the record of some aspect of a child's intellectual or moral progress during a certain period. No part of the curriculum of a training college is likely to be of greater value than this in forming the efficient teacher, at once humanly interested in children and competent to understand them.

In urging the desirability of a direct study of the main principles of psychology one needs to warn the teacher against a possible misapprehension. These principles are not meant afterwards to be carried about and labelled as so many prescriptions which can be brought out and ap-

plied as occasion requires. Pure science does not help an art in this manner. The scientific knowledge which the physician has gained in the dissecting-room and physiological laboratory is not clearly recalled and applied when later on he stands at the bedside of a patient. Many of its details may even have been forgotten. But the effect of it is not lost. It has combined with the later practical knowledge gained in the hospital and in private practice, illumining this and transforming it into a faculty of clear and penetrating vision. Similarly the teacher, in the training college and later, must ever be fusing scientific principles with the practical lore acquired by himself and by other teachers. The statement of the text-book must be vitalised by concrete illustrations drawn from the experience of the class-room. Conversely, practical problems must be dealt with in the light of principles, *e.g.*, in testing the suitability of a lesson to the known interests and capabilities of a class. In this way, as in the case of the physician, scientific and practical knowledge will be organised into a special aptitude, a penetrating and comprehensive insight into children and their needs.

It may be added that a new branch of inquiry is in process of formation which promises to bring together the scientific, or theoretic, and the practical side of the teacher's training. This is called Experimental Pedagogy. It has developed out of child-study, but it has its more special and practical aim, namely, to test the effects of various kinds of school work. "A pure pedagogical experiment," writes the latest authority on the subject, "is one in which the child is object, but of which the direct meaning and aim is the determination of the values of pedagogical means and methods."[1] This new line of experimental work will be frequently referred to in the course of this volume.

Plan of Exposition. A word or two as to the order of exposition to be followed here. After a sketch of the

[1] E. Meumann, *Vorlesungen zur Einführung in die Experimentelle Pädagogik*, i., Erste Vorlesung.

physiological groundwork of mental processes, a general survey of the field of consciousness will be made and the principal types of mental process distinguished. This "bird's-eye" introspective survey of the mental field will be followed by a sketch of the principal stages of mental development in its several directions. We shall then pass from a general account of mind and consider separately the development of the intelligence and of the other principal phases of mind. This detailed treatment will set out with a short description of the type of process concerned, *e.g.*, perception or imagination; after which the early develop mental stage of the process will be briefly indicated. Here we shall be concerned in the main with the common or typical form of process, though some reference will be made to its variations in different individuals. To this account of the principal forms of process will be added a few general remarks on the direct bearings of the facts and principles on educational work. In order to enforce the organic unity of mind, which the detailed examination of the various processes is apt to hide from the student, a concluding chapter will be devoted to the connections and interactions of the several processes in the concrete mental life, and to a fuller psychological consideration of individuality.

NOTES.

NOTE A (p. 7).—See Dr. Howe's report of his education of Laura Bridgman, *Mind*, i. (1876), pp. 263-67; and Helen Keller, *The Story of My Life*, and *The World I Live In*. Some of these records, it may be added, are enriched by the fruits of introspection. More than one blind person have given us their own accounts of their peculiar experiences. Helen Keller shows considerable power of introspective observation.

NOTE B (p. 18).—It is just announced that in the plan of study for Prussian training colleges, the development of the mental life of the child, along with the more important processes and laws of mental life, is to have its place. See Tracy-Stimpfl, *Psychologie der Kindheit*, 2nd edit., 1908, Vorwort, p. v.

CHAPTER II.

CONNECTION OF MIND WITH BODY.

General Aspects of the Connection. We all know well enough that there is a close connection between our consciousness, that is our thoughts, feelings, desires, emotions, etc., and the brain. The relation emerges clearly from a thousand facts of common knowledge, and more clearly still in some exceptional cases. Dr. Leonard Hill tells us of a man who, holding out a piece of his own skull, begged for money in the streets of Paris. The upper portion or vault of his skull had been torn off as the result of an accident. For a small sum he "would allow any one to press upon his brain, and when this was done he lost consciousness, and, as it were, fell into a deep sleep. But when the pressure was withdrawn, consciousness returned and the man awoke from his sleep."[1] The loss of consciousness was in this case due not to any injury to the brain but merely to the forcing of blood from it by the pressure. A similar result can, as we know, be produced in a normal individual by a violent blow on the head, consciousness returning only after a longer or shorter interval.

Thus a necessary precondition of consciousness is that the brain should be not only intact but in good working order. Now, apart from accidents such as we have been considering, the good working order of the brain can be interfered with from two sides. In the first place, it is an organ of the body, and as such is affected by the state of the other organs and of the body as a whole. But secondly,

[1] *Manual of Human Physiology*, p. 357.

the brain has its own special functions or activities, and these activities, while conditioned by the state of the brain, themselves modify it. We do not need to be told that the brain is not so efficient at the end of several hours' study as at the beginning. This exhaustion of the brain caused by its own activity is a fact of the utmost importance, and we shall deal with it more fully later on after giving a slight account of the structure of the organ and the nature of its activity. For the moment we will return to the consideration of the ways in which the condition of the brain depends upon that of the organism as a whole.

The Brain as Part of the Bodily Organism. The state of the vital organs exerts a profound influence upon the energies of the brain. When a special demand is made on the digestive organs, as after a good meal, leading to a diversion of blood as well as of nervous energy in the direction of these organs, we are temporarily unfitted for severe brain exertion, even if we do not yield to the delights of a nap. Functional disturbances in these vital organs, such as a fit of indigestion, or even an impeded circulation of the blood leading to chilliness and a sense of bodily depression, are known to be an obstacle to mental activity. Long fasting also unfits us for brain-work, while it may, as in the case of the mediæval saints and ascetics, give rise to strange visions and hallucinations. Excessive bodily fatigue may have similar results or lead to loss of memory. Sir Leslie Stephen, describing a trying experience in the Alps, tells us that he fell half asleep as he walked, seeing along with the real objects dream-objects, old friends, etc., who came along the road and vanished as he approached.[1] The effect of various drugs is familiar to all; some, as alcohol, opium, hashish, produce a temporary increase of brain activity or cause wild dreams and visions; others, such as chloroform, lower brain-action even to the point of total unconsciousness.

Apart from these extremer cases, however, the "organs

[1] *Life of Leslie Stephen*, by Prof. Maitland, p. 84

of mind," as they have been called, share with the whole body in the vigour and freshness of the morning, and the lassitude of the evening. It has been shown that the tide of nervous energy rises to a maximum in the first part of the morning, then falls until the midday meal, after which it gradually rises to a second but generally lower maximum, and finally sinks again. Thus if plotted out as a curve the rhythmic rise and fall would take roughly the form of a capital M.[1] The exact form of the curve will, however, depend upon many circumstances, and will be different for different individuals. Some are "morning workers," that is are able to do their best work in the morning, while others are more efficient in the evening. To this point we shall return later. At present we are only concerned to show that brain vigour depends upon sleep, meals, etc., and varies with the state of the other organs, sharing in their fluctuating well-being. Finally, it is all-important for the educator to remember that the brain passes through stages of growth and decay corresponding roughly at least with the progressive growth and decay of the body. Its powers in early life are thus necessarily limited by the imperfect state of development of the whole organism.

The Nervous System: (*a*) Simple Type. So far we have been speaking of the brain as though it were the complete and only physical basis of mind; whereas in reality the brain itself is only a part of a system of organs —the nervous system—with which it is as intimately bound up as is the heart with the veins and arteries. In the higher animals and in man this system is extremely complex, but it remains essentially the mechanism which enables the creature to act in accordance with the impressions which it receives from the outer world. Now to be able to receive impressions at all an organism must have one or more sensitive points; and to act it must have contractile tissue which in higher animals becomes

[1] L. W. Stern, *Ueber Psychologie der Individuellen Differenzen*, p. 120.

muscles. In its simplest imaginable form, then, a nervous system might consist of a nerve fibre connecting a single sensitive point with one simple form of contractile tissue. By its means the excitement caused at the sensitive point, by contact or other stimulation, would be carried to the muscle, causing it to contract. Such a group, sensitive point, muscle and connecting nervous fibre, is called a *sensori-motor arc*.

As the organism develops in complexity it will acquire more sensitive points, more muscles and more connecting fibres. This may be illustrated by comparing the nervous system with a system of telephones. The single sensori-motor arc would then answer to a private telephone between two houses. It is, however, of comparatively little advantage to be able to communicate with one person only, we want to be in touch with as many as possible. But as soon as the number of houses is increased two possibilities arise: separate connecting wires may be run from each house to every other one, or a central office may be formed with wires radiating to the various houses. This latter arrangement is of course very much the more economical, and is always adopted in practice. Similarly, as the number of points to be connected grows very large, it is found advantageous to form a number of such central offices and to connect these in their turn by a still more central one. It is worth noticing that the wires are not in permanent connection at the offices, but any wire can be "connected up" with any other or others. Further, however complex the system, it remains essentially an elaboration of the original simple connection between two points, and such a connection may be said to be its unit.

The analogy must not be pushed too far, yet up to a certain point it is perhaps helpful. For, in the case of the nervous system also, as the number of sensitive points and muscles increases, centres are formed from which nerve fibres radiate out. These fibres are massed together in bundles, like the wires of a cable, and are known as *nerves*. Each nervous connection has at least two parts: (1) a nerve

leading from some sensitive area, *e.g.*, a portion of the skin, to the centre, and known as an *afferent* or sensory nerve; and (2) one leading from the centre to a muscle or group of muscles, and called an *efferent* or motor nerve. Yet as regards function each arc remains a single whole. Again, as the number of points to be connected increases still more, higher centres are formed to connect the lower ones. Thus there arise different levels of arcs, those of the lowest level passing through only a single centre, those of the higher levels passing through several. Just as in the case of the telephones, there is no permanent working connection between the various points, though connection can be established between any two.

(*b*) **Nervous System in Man : General Structure.** If now we turn to the nervous system as it exists in all its complexity in a human being, we find that it consists of three principal parts: (1) the nerves, (2) the spinal cord, and (3) the brain. The afferent nerves lead from the *periphery* —that is from various parts of the surface of the body as well as from joints, tendons, muscles and the internal organs (heart, etc.)—to certain nerve-centres in the spinal cord and thence to higher centres in the brain.

The spinal cord may be described as a thickish rope of nervous matter consisting of centres and nervous threads. It extends through the whole length of the back and is continuous, at its upper extremity, with the brain. This latter consists of more elaborate arrangements of centres and connecting nervous fibres; but only the upper and larger portion of it, known as the cerebrum, or great brain, need be described here. It may be roughly compared with the kernel of a walnut, for it fills the cavity of the skull as the nut fills its shell. Its surface is corrugated into a number of folds or convolutions, and consists of a skin or bark of grey substance, while the interior portions are white. This surface is known as the *cortex* and corresponds to the yellow skin of the kernel. Finally, just like the walnut, the cerebrum consists of two similar hemispheres, connected only by a bridge in the middle.

Function of Nerves and Nerve-centres. A few words must now be said as to the functions of these three parts of the nervous system and their relation to the sensori-motor arc of which the whole system was said above to be an elaboration.

The function of the nerve-fibres and the nerves is clear. They correspond to the wires of the telephone and serve to transmit the excitement produced at a sensitive point, or sense-organ, through one or more nerve-centres, to one or more muscles.

The spinal cord has a two-fold function. In the first place it constitutes a series of centres or meeting-points of nerves, at which the impulse arriving from a sense-organ by an afferent nerve is handed on to an efferent nerve and so to the muscle to which that particular efferent nerve leads. The sensori-motor arc thus formed is of the simplest type, since only one centre is involved. But the spinal cord consists partly of nerve-fibres leading from these spinal centres up to the brain, and of nerve-fibres leading back from the brain centres. These arcs are more complex since the impulse passes through the spinal cord to a brain centre and back through a spinal centre again.

The brain itself consists firstly of the centres just referred to and of yet higher centres connected by fibrous connections and forming extremely complex chains. The whole arrangement may be described as a building up of the functional unit, the sensori-motor arc, into a system of centres of growing complexity, namely, those of the first level, of the second level, and of the third level.

Consciousness and the Nervous System. We have now to see in what way consciousness is connected with the nervous structures. Take the first convenient young human being, of the age, let us suppose, of six, request it to close its eyes and put out its tongue; then place on the protruded organ a little sugar. If the experiment be successful the subject will proceed to execute various movements of the mouth and throat tending to absorb the proffered substance more completely. This done, he will

very probably convey to the investigator his willingness to submit to a repetition of the experiment.

Now the course of events here may be described from either of two points of view. First, from the physiological standpoint we may say that the nervous excitement produced by the stimulation of the organ of taste was propagated to the brain and thence to various muscles, the whole series constituting a sensori-motor arc. But secondly, from the psychological point of view, we may say that the child had certain sensations of taste, that it found these pleasant, and that it wished or tried to prolong the sensations.

Thus it appears that in this familiar process there are really two concomitant series of events: the nervous series which begins with stimulation of the sense-organ, and the conscious process which begins with sensation. We may say that whenever there is a conscious process there must be a corresponding nervous process. But we cannot convert this statement, since the conscious process in the case considered does not arise until the nervous excitement reaches the brain.

Not only so, there are some reactions to stimulus which are not accompanied by consciousness at all. On tickling the feet of a man whose spinal cord is severed, his legs may suddenly jerk up; but of both the tickling and the movement the man will remain entirely unconscious provided that he does not *see* his legs.[1] This would be a reaction carried out solely by means of an arc of the first level. Apart from such exceptional cases many of the reactions necessary to the well-being of our bodies are thus carried out through the medium of lower centres and without the help of consciousness. We need only instance the two most important of all, respiration and the circulation of the blood, the latter of which is quite independent of consciousness, while the former is only slightly controlled by it. It appears then that nervous process which does

[1] Hill, *op. cit.*, p. 360.

not involve the cerebrum is not accompanied by consciousness. It may be added that some processes which do involve the cerebrum may from repetition become at least partially independent of conscious control. This is the case with complicated series of movements which are difficult to learn but which later become automatic. Instances are writing, playing the piano, or speaking. That the cerebrum continues to be involved in these, even when they have become automatic, seems to be proved by the fact that "when the so-called motor cortex has been removed, skilled acquired movements are lost".[1]

Speaking broadly then, consciousness accompanies only those nervous processes which take place in the highest centres in the cortex, and it tends to be withdrawn even from these when they become familiar through frequent repetition.

Value of Knowledge of Nervous Structures to Psychologists. Although consciousness is always accompanied by activity of the nervous system, and though the functional unit of this latter is the sensori-motor arc, yet we shall find that we cannot make much direct use of this conception of the arc—except in a modified form—in our psychology. For, firstly, we can observe far more about our conscious processes than about the corresponding nervous ones, and the facts are therefore far more complex on the psychological side and less easily reducible to a simple scheme. But secondly, we shall find that our conscious life is not a succession of discrete sensations each followed by its own reaction. During the whole of waking life consciousness forms a continuous stream; there is a constant reception of impressions and a constant putting forth of effort. There is, we may be sure, no stimulation without its effect, but we cannot always trace one particular impression till it emerges as one particular reaction. Moreover, the reactions that we often find it convenient in practical life to regard as the results of certain impres-

[1] W. McDougall, "Physiological Factors of the Attention-Process," *Mind*, N.S., vol. ii., p. 324.

sions may be separated from these by a long interval of time, as when a wrong done leads to an act of revenge after years of plotting. Further, for analytic psychology the chief interest lies rather in comparing one with another the successive impressions, or the successive efforts, than in considering concrete instances of complete reactions. Thus, as we shall see in the next chapter, the conception of the arc becomes replaced by that of the tripartite division of consciousness, the view that the stream of mind consists of three parallel *currents* which can be *thought of* separately, but cannot be separated in fact.

Nevertheless, from the practical point of view—and this is the teacher's point of view—the conception of the arc is most important. More especially is this the case since children tend to react at once to any and every stimulus. It is only gradually that deferred reaction to accumulated stimuli becomes possible. Education, it may be added, is the great agency by which the young are brought to receive impressions, reactions to which are deferred for years to come. Much of what a child learns at school will only be fully acted upon (if at all) after he has grown up.

How the Brain does its Work. We have so far spoken of nervous action or process without inquiring more closely into its nature. In what follows, we shall confine ourselves to the changes which take place in the tissues of the brain.

We must suppose that when, as the result of the stimulation of a sense-organ, nervous excitement is propagated to some portion of the cortex, there is a breaking down of certain highly complex chemical substances. This sets free something which we can only describe as "nervous energy," which in its turn breaks down the next succeeding cells, and so the energy or discharge is handed on from one point to another. The decomposed substances must somehow be built up again before that particular part of the central organs can be ready for action again. The mechanism by which this is carried out is the capillary circulation. The blood has to bring the nutritive materials

for the processes of repair. More than this, it has to bring the oxygen which is required for the functional activity of the cells when they undergo disintegration, and lastly to carry off the poisonous waste products of this disintegration. The brain may be likened to an engine which can only do its work when fuel is supplied and refuse removed.

We see from this that the central nervous substance is being ever unmade and remade or disintegrated and redintegrated; and further that there is a necessary relation between these two processes. No action of the brain is possible save so far as the processes of nutrition are carried out. For continued brain action there must be a constant process of redintegration sufficiently rapid to compensate for the disintegration.

The Growth and Development of the Brain. The development of the nervous system from a simple form to its present complex one has already been referred to. This development is a slow process of change that has been going on for hundreds of thousands, perhaps millions of years, and which, starting with some tiny lump of animate jelly, has led, through countless intermediate forms, to man. This process of organic evolution can only be inferred, not directly observed, and its discovery was one of the greatest steps in the progress of science. There is, however, another kind of development that we all have opportunities of directly observing: namely, the growth and changes which every animal, and every human being, pass through between birth and death. We say growth and change, for mere increase in bulk is a very small part of the process. It is sometimes said that a child is a little man, "But this is precisely what he is not, any more than a grub is a little butterfly, or a tad-pole is a little frog".[1]

That mere increase of bulk is a very small part of the maturing of the body is strikingly illustrated in the case of the brain. In mere bulk it is extremely large at birth,

[1] J. Adams, *Primer on Teaching*, p. 7

weighing 11·67 oz. in males and 10 oz. in females. In a period varying from six to twelve months these weights will have increased to 27·4 and 25·7 respectively.[1] Growth is then less rapid until about the seventh year, by which time it has almost attained its full weight (about 49 oz. in males and 44 oz. in females).[2] Thus it might seem, if bulk were everything, that the brain reaches maturity at a relatively early age, whereas in reality the reverse is true. In what then does development consist, beyond increase in bulk? The essence of development is advance in differentiation, or specialisation, that is to say, the emergence of differences between part and part, each part taking on a more special form of structure and function. Thus, as a plant develops the primal similarity or homogeneity of its parts gradually gives place to the appearance of a number of dissimilar, heterogeneous organs, root, stem, leaves, etc. Along with this advance in differentiation or specialisation of parts there goes an advance in complexity, or what is known as an organisation or "integration" of parts into a connected system. That is to say, the several parts differenced out one from another take on connections one with another, which connections are necessary to a harmonious functioning of the whole as a system or organism. In this way the several organs, as those of circulation and respiration, are brought into organic connections so as to work together for the maintenance of the whole organism.

Development of the Two Sides of Nervous System. These processes of differentiation and integration go forward on both the receptive and the active side of the nervous system. Thus on the receptive side the impressions caused by the stimulation of the end organs of the afferent nerves gradually come to differ according to the particular sense-organ, or part of it, in which the nerves terminate. And further, these impressions do not

[1] F. Warner, *The Nervous System of the Child*, p. 28.
[2] L. Hill, *op. cit.*, p. 351.

remain isolated but become grouped in various ways into complex wholes. When, for example, we perceive any familiar object, such as a stone, a piece of wood, or a strawberry, our knowledge depends upon our ability, when distinguishing different elements of colour, of shape, etc., to grasp as a single whole what is really a complex of a number of pieces of information. In tracing out this perceptual differentiation and integration the consideration of physiological accompaniments helps us but little.

With regard to the active or motor side, however, we can say rather more about the physiological aspect. All through life we are learning to react suitably to the impressions that we receive from without, and in the earlier stages reactions are scarcely more than bodily movements. At first almost the only kind of reaction of which the infant is capable is a vague contraction of all the chief muscles of the body. It is only by gradual processes of differentiation and co-ordination, to be dealt with later, that muscular actions become restricted and specialised, and at the same time combined in definite complexes corresponding to movements such as writing. This presupposes the formation of the necessary central connections. One important characteristic of this early motor development, as conditioned by the development of the organs concerned, is that it proceeds from the trunk outwards, control over the muscles of the shoulder and thigh being acquired before that of the muscles nearer the extremities.

Brain-work and Fatigue.—It follows from what was said above about nervous activity that when this is prolonged there must be a continual process of reconstruction keeping pace with the decomposition. If, and in so far as, the reconstruction cannot keep pace with the disintegration there is a condition of fatigue. "Weariness comes . . . not so much because capital has been spent as because it has been spent at too quick a rate, it has been spent more quickly than it can be replaced."[1]

[1] Sir M. Foster's article on "Weariness" in *The Nineteenth Century*, September, 1893, p. 340. The whole article should be read, as it gives an admirably clear account of the chief physiological aspects of fatigue.

Not only so, education of some kind is necessary to the full development of the brain. Although the child's self-prompted activities and the influence of lively companions may do much to develop his brain-powers, such development is apt to be very imperfect. Physiologists tell us that only a certain number of the nerve-cells of the cortex reach a high degree of structural development. The educator helps to determine which among the thousands of these microscopic germs of cells shall reach maturity.

This essential wholesomeness of mental work—of the proper kind and amount—for normal children is the great justification of our school system, which foolish children and foolish parents, too, are apt to look at as not only artificial but baneful.[1] The right sort of school training should indeed aim at securing one important ingredient of health—what may be called healthy-mindedness. By this is meant not only an efficient condition of the brain and mental powers, but a readiness to find pleasure in wholesome sorts of mental activity, and such a keenness of interest in things of the mind as may serve as the most efficient barrier against idleness, as well as the unwholesome and perverted forms of enjoyment to which idleness is apt to lead. This aim of the school should ever be present to the teacher, and particularly so in an age when many boys and girls seem on leaving school to carry with them so little in the way of intellectual thirst and the impulse towards self-culture, and weakly to yield to the prevailing habit of reading flimsy newspapers and other trash.[2]

Overtaxing the Brain. While a moderate and sufficient exercise is thus seen to be beneficial to the brain, it follows from what was said above that it is possible to exact from the nerve-centres more work than it is good for them to perform.

[1] The question, how far the beginning of school life affects the health and bodily development of children injuriously, will be touched on in the last chapter.

[2] See a paper by the author on Healthy-mindedness in the Transactions of the Second International Congress on School Hygiene, 1907.

both of physical and of mental exertion in so far as such exertion involves the fatigued parts of the nervous system. And since, as we have seen, severe fatigue does not remain localised but tends to spread through the whole system, it follows that this effect, when caused by mental effort, not only is not removed by violent physical exertion but is intensified by it, and conversely. Some have even held that all fatigue, however produced, can be measured by its effect upon a simple physical effort, such as lifting a weight with one finger. (On experimental work on fatigue, see Note A at the end of this chapter.)

Bearings on Education.

The facts dealt with above have important bearings on the problems of Physical Education, such as how we can best further a child's bodily health, and what is the proper place of bodily exercises in the early stages of his development. This part of educational theory, however, is best treated in connection with the sciences of physiology and hygiene. The special aims of motor training will be touched [illegible] (p. xviii.). Here we shall confine ourselves to the applications of the above theory of brain activity and fatigue to the proper work of the school, that is, mental work.

Normal Exercise of Brain. The brain like other organs requires appropriate exercise. When the central organs are well developed and there is a good supply of nervous energy we see that children tend to seek mental activity and to feel depressed and miserable when cut off from it. The tedium or *ennui* from which many lonely children are apt to suffer is, as we shall see, an expression of this disposition of the brain to carry out its proper activity. The educator in introducing a certain amount of brain-stimulus is thus ministering to its health and its continued efficiency. Many children grow brighter and happier on entering on school life, just because this supplies a healthier *régime* for the activities of the brain and of the nervous system as a whole.

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Such over-stimulation shows itself first of all in brain-fatigue, which means, as we have seen, that cerebral activity has been carried beyond the point at which recuperation keeps pace with expenditure of energy. We are all apt to feel muddled or stupid, if not to suffer distinct pain in the shape of headache, after a too severe mental strain.

A more prolonged excess of brain-work may induce other ill-effects of over-stimulation. If we persist in studying when cold and hungry, and if, worse still, we form a habit of continuing study to the neglect of the conditions of bodily health, we are apt to induce graver evils. Nervous breakdown is known to occur as the result of too long and severe application to mental work, more particularly under the artificial stimulation of keen competition and of our examination system. These risks of over-stimulation are peculiarly great in the case of young children. During the periods of more rapid growth especially, a large fund of nutritive material is drafted off for the purposes of growth. Consequently, if a large amount is at the same time consumed by the brain, the progress of physical growth as a whole is liable to be obstructed. Not only so, since when the whole organism suffers each organ suffers, the brain itself will suffer yet more by the reflected effect of the lowered condition of the whole.

In exercising a child's brain the educator should remember that the several functional activities making up the life of the organism are developed in a certain order. In the fœtal condition, and for some time after birth, the vegetative or nutritive functions are preponderant. The organism is now chiefly concerned in building itself up. Then follow the animal functions of sense and movement, which begin to come into activity soon after birth, though they only attain considerable vigour much later. The highest or human functions, those constituting the intelligent life of man, reach their development later still. A boy of twelve or fifteen may have perfect senses and considerable firmness and flexibility of muscle, though his brain-development still falls far below that of an adult.

It follows that the higher sort of mental training which makes severe demands on the brain should be introduced cautiously, the amount of strain required being slowly increased by means of well-thought-out gradations.

Remission and Variation of Brain-activity. (*a*) **Value of Change in Work.** The great danger, especially with young children, is that of unduly prolonging the duration of the effort of mental concentration. Short lessons must be the rule. The question then arises, what is to be done at the end of a lesson: is mere change of work sufficient, or must there be a pause, and if the latter, how should it be spent? We have seen that the sensori-motor arcs of the highest level include brain-centres not involved in those of the lower levels; moreover, certain tracts of the brain are specially connected with impressions coming from certain sense-organs. Thus to some extent there is localisation of function in the brain, and we might suppose that when one tract has been wearied it could be reposed by a change of occupation. But "change of work is recreation . . . only in so far as it is rest"[1] for the fatigued centres. Such a change would be, for instance, from a lesson involving much eye strain, as in writing and reading, to one where the chief demands are upon the ear, say in listening to a story for composition. Or, again, the change might well be from a thinking subject to a comparatively mechanical one such as singing. But it must not be supposed that there is an algebra brain-tract, a Latin brain-tract and so on. Thus even in so far as fatigue is local—and, as we have seen, it does not long remain local—it cannot be removed by a mere change of subject in this sense. It is true that such a change may *seem* recreative, but we must distinguish fatigue proper from subjective weariness, the mere feeling of *ennui* or tedium. The change may remove this by means of the interest in the new subject and yet leave the real fatigue untouched, though concealed for the time.

[1] R. McDougall, "Fatigue," *Psychol. Review*, 1899, p. 207.

(*b*) **Need of Pauses.** It follows that if fatigue is at all severe the only cure is a pause. But such a pause of, say, ten minutes, can be very variously used: the children can be given gymnastics or drill, they can be made to walk sedately round a quadrangle, or they can be turned out to do what they like. Since the object of the pause is rest the best possible alternative might seem to be complete idleness. It is at least true that any severe muscular exertion will do harm instead of good. More especially gymnastics are one of the most exhausting of school subjects. Yet complete idleness, even if practicable, would not be desirable. For, firstly, severe fatigue, as we have seen, means the presence in the nerve-centres, and later in the blood, of poisonous substances for which the best cure is oxygen, and an increased supply of oxygen requires increased activity of the lungs and plenty of fresh air, conditions which are best realised by quick movement out of doors. There is a sense of exhilaration and quickening which follows a sharp "sprint," such as can hardly be produced in any other way. Gymnastics, on the other hand, while involving considerable strain have not the same effect; they are often practised, moreover, in air that is by no means fresh (Note B). But further, the fatigue of young school children is not merely due to intellectual work; the sitting still and inhibition of the thousand movements natural to young children involve muscular strain quite as real as that due to positive movement. As Prof. Judd puts it, the child who sits still in school really goes through the labour of getting up to look out of window and the labour of inhibiting the movement.[1] And "rest" in this case means not further immobility but the letting loose of the pent-up motor impulses. Finally, in the case of older pupils, as one may see in a French lycée, there is a danger that if there is no proper opportunity for physical exercise, they will occupy the pauses in discussing difficult problems and so get no rest at all.

[1] *Genetic Psychology for Teachers*, p. 79.

There is no doubt an obvious objection to frequent alternations of work and comparative rest. There is always an apparent loss of time after a break, since order must be restored in the class and the pupils' minds recalled to the attitude of attention. Not only so, in no kind of activity are the first few moments the most efficient; fatigue never shows itself as a constant decline in power from the very beginning, but there is always at first a rise to a maximum efficiency before the fall begins. One investigator found that at first his forefinger could lift a weight of only 800 grammes but after a few attempts could lift one of 1075.[1] This initial improvement—to which the name of "warming up" has been given—must of course be gone through again after each pause or change of work; the ideal pause would be of such a nature and length as to combine a maximum of rest with a minimum loss of "readiness for work".

NOTES.

NOTE A (p. 34).—*Experimental Work on Fatigue.*—An early attempt to measure fatigue was that of L. Burgerstein (*Die Arbeitskurve einer Schulstunde*). He gave a class work of a uniform nature, such as dictations, and tabulated the mistakes made in the first, second, third and fourth quarters of the hour, regarding the decrease in efficiency as a measure of the fatigue. It has been pointed out, however, that such an experimental lesson is too monotonous and wearisome to be typical of the ordinary school lesson. Later investigators have tried to avoid this difficulty by applying the test at intervals during the ordinary school work. These tests may be divided into two groups: (1) the bodily, (2) the mental.

(1) Bodily tests. We have seen that fatigue tends to spread beyond the parts of the nervous system in which it arises. Mosso went so far as to maintain that fatigue, however produced, can be measured by its effect upon some standard reaction. To this end he devised the *ergograph*, a specially prepared apparatus by which, the hand and arm being supported, a weight is lifted by the finger to which it is attached by a string. The "subject" is required to lift the weight as high as possible at regular intervals as long as he can. The height of the lifts is found gradually to decrease, until the weight cannot be raised at all, the finger being tired out. The rate at which this fatigue shows itself, however, varies considerably for the same subject

[1] A. Allin, "The Origin and Function of Habits," in the Investigations of the Depart. of Psych. and Educ., University of Colorado. See also A. Mosso, *Fatigue* (English translation), p. 300.

at different times, and is assumed by Mosso to provide a measure of the subject's general freshness or fatigue at the beginning of the experiment. An account of these experiments will be found in A. Mosso's *Fatigue*, translated by M. and W. B. Drummond. The ergograph has also been used by Kemsies, Binet and others.

It has, again, been held that just as fatigue reduces the vigour of every kind of reaction, so it also reduces the sensibility of the whole body. Accordingly some workers, notably Griesbach, Wagner and Blazek, have made use of the *æsthesiometer*, which, in its usual form, is essentially a pair of compasses with an indicator showing the distance between the points, by which the tactile discrimination of points of the skin can be measured (see below, chap. v.). The transition point, or the distance between the points at which they can just be felt to be separate, is known as the threshold of discrimination for that part of the skin. This threshold will be found to vary slightly from time to time, and these variations are again regarded as indicating the subject's general fatigue.

Still another bodily method of measuring fatigue is that suggested by W. Stern (*Ueber Psychologie der Individuellen Differenzen*, p. 117) and adopted by W. A. Lay (*Experimentelle Didaktik*, p. 410). This consists in getting the subject to beat a simple rhythm, such as a series of "bars" of three beats, with the finger or a pencil, etc., upon a table. It will be found that there is a certain rate which seems easiest and most natural to one, and this indicates the person's "psychic tempo". This tempo, though approximately constant for the same individual, varies slightly, and these variations are again regarded as measures of fatigue.

(2) Mental methods. These are much simpler than the bodily ones and require no special apparatus. They all consist in making the subject do some intellectual work, of such a kind that its difficulty can easily be controlled, and that the efficiency of the worker can easily be calculated. Such work is, for instance, dictation, or adding or multiplying a long row of figures. The chief modification of this mode of measurement is the "combination method" of Prof. Ebbinghaus. Here the subject is given a piece of prose with blanks where syllables and words have been left out; these blanks have to be filled in by the subject. In all these cases the amount done in the time allowed—generally five minutes—and the number of mistakes as compared with the subject's normal efficiency at the same work, indicate the amount of the fatigue.

As to the results of all this work, little more can be done here than mention some of the questions which it has attempted to solve. Such are the proper length of lessons for children of different ages, the number, length and nature of the breaks between lessons, the comparative fitness of the morning and afternoon for school work.[1] Further it has been shown that one's nervous energy undergoes periodical variations, and an attempt has been made to determine how far these variations differ for different periods of life and for different individuals. Again, the different school subjects have been classified as more or less fatiguing. Such classifications, however, though most workers

[1] This is a question much discussed in Germany where, in the State schools, the whole school day is compressed into the morning—in general, eight to one in winter—and the afternoon is free except for singing, drawing, gymnastics, etc. Dr. Lay condemns this system strongly on the result of his experiments (*op. cit.*, p. 422).

agree to some extent in regarding Latin, mathematics and gymnastics as among the most fatiguing subjects, must be accepted with great caution and only in the most general sense. Thus Latin may *in general* involve much thinking and therefore be fatiguing, but it does not follow that the same will apply to Latin as taught by a particular teacher on a particular occasion to a particular class. "Latin" may mean learning a paradigm, reciting gender rhymes, translating an unseen piece, writing a composition, etc. In fact much more depends upon the teacher's method than upon the subject. This illustrates the kind of difficulty to which experimental work of this kind is liable. Another difficulty, which to some extent applies to all the methods described above, is that it is almost impossible to distinguish the effects of fatigue proper from those due to subjective weariness, the *feeling* of fatigue or tedium. Thus in the ergograph experiments, while the proceedings are novel the subject is likely to take more interest and exert himself more than later when they have become dull or even unpleasant. Even in æsthesiometer tests a great deal will depend on the degree of attention; while to the mental tests this objection will evidently apply with even greater force. Again, every kind of activity tends to improve with practice, and this increasing dexterity must also effect the results. It is true that these two tendencies will to some extent cancel one another, but for scientific purposes it cannot be assumed that this will always be exactly be the case. For these and other reasons, then, few of the results as yet obtained can be regarded as certain. Thus Binet and Henri admit that at present we cannot draw any conclusion directly applicable to schools,[1] and much the same view is taken by Barth[2] and Lay.[3]

NOTE B (p. 38).—This factor, the nature of the air in which exercise is taken, is of the utmost importance, and has, as Dr. Barth points out (*Elemente der Erziehungs- und Unterrichtslehre*, p. 150), been too much neglected. The ordinary gymnasium with its continually thumped mattresses is often very dusty, and where mattresses are replaced, as in some French lycées, by a substance resembling sawdust the case is worse.

[1] A. Binet et V. Henri, *La Fatigue Intellectuelle*, p. 330.
[2] P. Barth, *Elemente der Erziehungs- und Unterrichtslehre*, p. 149.
[3] W. A. Lay, *Experimentelle Didaktik*. Dr. Lay appears—very humanly—to make an exception in favour of his own method (p. 422), but this, in its turn, is described as *very inexact* by Meumann, *Experimentelle Pädagogik*, ii., p. 101.

CHAPTER III.

FUNCTIONS OF MIND: KNOWING, FEELING AND WILLING.

Analysis of Mind. Our study of mental processes must begin by an attempt to distinguish their more important varieties. This discrimination of one kind of process from another can only be carried out by means of an introspective examination of what takes place in our own minds. Since this examination proceeds by what is called "taking apart" more complex processes in order to single out for special inspection their several constituent processes, it is called Analysis, or more precisely Introspective Analysis. It is important to repeat that this "taking apart" is merely *thinking* apart, *i.e.*, distinguishing and not separating. Thus I can analyse a simple experience of pain into the *sensation*, the *feeling* of unpleasantness, and the *impulse* to get rid of this; though these three are in the actual experience inseparably conjoined. Psychological analysis is thus essentially a process of *abstraction*.

In the last chapter (p. 28) it was said that our conscious life is not made up of a succession of separate impressions, but forms a continuous stream. This figure of the "stream of consciousness"—which is due to Prof. James—lays emphasis on the continuity of our mental life and its constantly changing nature. But there are other characteristics which it does not bring out so clearly. Thus our consciousness is usually not of the same density, so to say, throughout; there is an intense central region, and on either side of this it shades off to a vague and ill-defined margin. The whole volume, moreover, varies from time to time, dwindling to a thin trickle when we are tired out.

Again, its whole character and form seem to change, as first one and then another feature emerges into prominence and subsides again, and as our surroundings and occupations vary.

If we take an introspective glance at our mind at any time we find a rather complex state of affairs, in which many elements concur and partly blend. Suppose you are reading a letter from a friend telling of his unexpected early arrival. The tidings bring about an excited condition of mind with a confused rush of ideas and feelings which it is very hard to distinguish one from another. Although some thoughts may stand out pretty distinctly, others are very faint and obscure. Not only so, your *total* mental state includes many elements not connected with the news, such as vague impressions of sight and hearing received at the moment, and still vaguer reports from the bodily organs telling of heat or chilliness, and so forth.

Yet, difficult as analysis is here, it is not impossible. If we take comparatively simple states of mind, if we confine our inspection to what is distinct and prominent, overlooking what is vague and hard to seize, and lastly if we compare one such state with others, we can soon disengage from the mixed and confused current of our mental life certain constituent processes which recur again and again in different combinations. Thus we find that though to perceive an object of sight is not the same thing as to perceive one of hearing, and though perception is different from imagining and from thinking, yet they all agree in being modes of *intellectual activity*.

Our everyday thought has, indeed, made us familiar with such distinctions. Our common ways of describing our mental life suggest that there are three main varieties of process. Thus when we observe, remember, or reason out something we are said to exercise our *intellectual* powers or faculties. When we are the subjects of pleasure or pain, of joy, grief or anger, we are said to be *feeling*. When we are doing things consciously and with purpose we are said to be exercising our *will*.

Triple Function of Mind. The psychologist starts from these well-recognised distinctions. He attributes to mind three functions, that is, three characteristic fundamentally distinct modes of reaction, *viz.*: (1) the *affective function*, as manifested in feeling; (2) the *intellectual or cognitive function*, in knowing; and (3) the *conative or striving function*, in willing. (1) The first covers all our mental processes so far as they exhibit a pleasurable or painful aspect or "tone". Thus a painful bodily sensation, an emotion of love or of fear, with its strongly marked feeling aspect, clearly illustrates the affective function. (2) The intellectual function is exercised in the various processes of perceiving objects of sense, imagining things, and reasoning about them. (3) The conative function is illustrated in simple voluntary movements, such as lifting the arm, and in all processes so far as they are strivings towards an end.

Fundamental Intellectual Processes. A more searching analysis of the process of knowing or intellection will make clearer what is meant by a mental function. For this purpose we will take as example the recognition of a friend in the street. Here the starting-point is a visual impression or "presentation,"[1] that is to say, the sight of an object of a particular form and colouring. Probably there will be many similar objects to be seen in the street, but unless we are to greet a friend in every passer, with unsatisfactory results, this object must affect us differently from other similar ones. So far as this is the case, this presentation has become *differentiated*[2] from others: we *discriminate* this object from others like it. Thus far there is nothing peculiar about this object; if we discriminate it from the rest of the objects we may be supposed equally to discriminate each of the others from all the rest; but now as we look at it suddenly it flashes upon us, "Why, it's Brown!"

[1] Presentation is that which is directly presented to us under the form of a sense-phenomenon, *e.g.*, a sight or sound.

[2] *Cf.* the use of the term differentiation as applied to an organic structure above, p. 31.

In more psychological language, the presentation slips, like a latch-key into its familiar key-hole on a dark evening, into traces left by previous presentations of the same object: in a word, the presentation is *assimilated* to earlier ones. Here, it should be noted, we are aware of little more than a sense of familiarity that jerks out of us the name "Brown"; there is no clear recognition of the nature of the similarity between this experience and the previous ones, nor of all that "Brown" may mean for us. But now suddenly it is borne in upon us that it means, among other things, some one to whom we owe five pounds; our hasty disappearance into the nearest shop does not at present concern the psychologist; the point of interest for the moment is the remembrance of the debt. Returning to more scientific terminology we may say that the thought of the name tends to bring with it the complex mental whole of which it forms part and of which another part is the memory of the five pounds. The connection of the name with the debt, etc., illustrates a process of Integration.

Our analysis[1] of the recognition of an acquaintance has yielded three fundamental intellectual processes, namely, (*a*) differentiation, (*b*) assimilation, and (*c*) integration. All cognitive (intellectual) activity consists of, or presupposes, the working up by these processes of presentative material. The material may be given us directly by our senses, or it may be supplied by memory or suggestion, under the form of ideas. It may be added that there are, as we shall see, two varieties of integration: (1) *complication*, in which the connected elements become fused into a single whole within which they are no longer separately recognisable, and (2) *association*, where they continue to exist as individuals within the group of which they are members.

Mental Plasticity and Apperception. What was said in the last section implies that there is mutual interaction between the mind as fashioned by past experiences and

[1] This analysis is of course not complete, for it deals only with the intellectual processes concerned. The concrete experience would, like every other, have its affective and conative sides also.

what is presented to it. The presentation modifies the pre-existing contents or tendencies, and these modify the presentation.

Thus, in the first place, Brown was recognised because previous experiences had enabled us to distinguish one man from another and to identify this particular one. If there had been no previous experiences, or if these experiences had had no lasting effect, recognition would have been impossible. Every impression which comes to the mind from without produces some modification in it, however slight, and this modification persists; it may indeed fade with time, but it never entirely disappears. This modifiability of the mind by its successive experiences and activities may be called *mental plasticity*.

But, secondly, it is equally true that the state of mind, as determined by its congenital tendencies, its plasticity, and the nature of its previous experiences, reacts upon any new impression. Even in the simple-looking act of *seeing* a man we are, as will be shown later, adding something to the visual impression from our mind's store; for the man may turn out to be a suit of clothes stuffed with straw, while "manhood" implies more than this even to a cynic.

As this illustration shows, in all cases of intelligent observation, recognition, etc., our "sense-impressions," as soon as we are aware of them, have begun to be transformed and added to by various mental processes. There has sometimes been a tendency to neglect this aspect of the matter and to speak as though the new impression were itself objectively determined, while the result of previous experience were merely to determine the nature of the ideas "called up" by the impression. In reaction to this view, and to emphasise that there are not two separate stages of "impression" and "mental transformation," some writers would prefer to describe all such recognition, identification, etc., as instances of *apperception* (Note A). Thus apperception is not to be regarded as a new process on a level with but distinct from differentiation, assimila-

tion and integration, but rather as another name, adopted from a different point of view, for a certain aspect of these three processes as acting together in modifying the new impression.

No reference has been made in this analysis of the intellectual processes to our everyday popular distinctions, the "faculties" of observation, imagination, reason, etc. Psychology has for some time recognised that these distinctions cannot be made fundamental, but that so far as real, they are derivative from more elementary ones. (For a fuller consideration of the faculty-theory, see below, Note B.)

Relation of Feeling, Knowing and Willing. These three phases of mental activity are not equally prominent at all moments. If, indeed, we take any one of these aspects of mind in a fully developed and strongly marked form, it seems in a manner opposed to the other aspects. Thus a wave of passionate feeling excludes at the time calm thinking (recollecting, reasoning), as well as concentrated effort. Yet the three functions are in reality inseparably connected. A mind or mental organism seems more of a unity than the bodily one with which it is so closely connected. As we have seen, our analysis of mind into functions rests on distinctions *in our thinking*: our real mental processes are always compounded of the three factors. We cannot experience any pain without being intellectually active, so far at least as to have a glimmering of the seat or the cause of the pain, or without being conatively bent on getting rid of it. So again in our calmest intellectual moments we can always detect some element of agreeable or disagreeable feeling, a sense of ease and success or of difficulty and perplexity, as well as a conative factor in attending to our ideas and trying to develop them to greater clearness. Thus we may say that although one function may at a given moment be more prominent than the others the three always work together in producing our concrete mental states.

As we saw above when examining the workings of the

nervous system, we are so organised as to respond actively by means of our muscular movements to the reports we receive from our environment through the channels of the senses (see p. 23). So too we find, if we carefully analyse our mental processes, that they commonly disclose the same order of events. Thus in crossing a street I perceive a vehicle about to come athwart my path, and I either stop or hasten my steps; or I hear of a friend's marriage and set about writing my congratulations. An intellectual process leads, then, to some appropriate action. In both these cases, however, there is something more; the intellectual process is accompanied by feeling, the sight or sound of the vehicle causing an incipient fear, the news giving a pleasurable excitement.

Now this order is so common as to be typical. We may say, then, that our concrete mental processes are complex and of a triplex form, being sense-presentations (or ideas) which are attended to and intellectually manipulated under the stimulus of feeling, and lead on to appropriate strivings.[1]

The Three Mental Functions and the Sensori-motor Arc. It was said above (p. 28) that for psychology the conception of the sensori-motor arc is not of much direct use, but is replaced by the somewhat different notion of the threefold division of consciousness. One striking difference in the two is that in the latter there appears a third element; knowing may be said to correspond to the afferent half of the arc, willing to the efferent, but we cannot point to a similarly distinct physiological counterpart to feeling. Moreover, as was pointed out above, we cannot always regard a particular desire or effort as the effect of a particular impression—or rather we can ascribe it to different impressions according to our point of view. In a long prepared act of revenge the final blow may be

[1] The student who wishes to see this typical plan of mental process more fully described may consult Dr. Ward's article on "Psychology" in the *Encyclopædia Britannica*, pp. 39-44; also Miss Brackenbury's *Primer of Psychology*, chap ii.

regarded as the reaction to the original injury, or simply to the sight of the wrong-doer in one's power. All the long planning, self-training, etc., are from one point of view only the intermediate stage between stimulus and response, while from another they themselves consist of innumerable particular reactions. However this be, there is built up out of them something that we call knowledge or experience, and this is for the time regarded as an end in itself.

Still more must this be the case with education in the wider sense. It would be a great mistake to try to educate a child merely for certain definite forms of motor reaction, such as those required for a particular trade. Our object may be said always to be the creation of the capacity for practical activity; but this can only be done by aiming freely at knowledge and skill as desirable in themselves. Nor must it be forgotten that there is more than one kind of "reaction". There is mental effort as well as muscular, to say nothing of the fact that the former always involves the latter to some extent. In man "theoretical" interests are as real as practical, and education, except in the case of quite young children, is especially concerned in developing these. We cannot in human psychology treat intellectual activity as a mere incident in practical life. It is essentially correlated with the functioning of those higher nerve-centres in the cortex, which, as we have seen, have as a chief part of their work to assist in the elaborative work of the mind—the formation of ideas and the rest—which breaks up the early sensori-motor type of nervous action. As Prof. Titchener has it, "the office of the cortex may properly be described as the disjunction of the reflex arc".[1] Even in the infant, bodily activity to a great extent subserves the gaining of new experience and impressions; he is continually handling things, opening boxes, turning the leaves of books, dropping things to hear them bang, etc. That all study should directly prepare for practice is a proposition which, if taken literally,

[1] *Psychology of Feeling and Attention*, p. 310.

would justify the most narrow utilitarianism in education. Psychology must back up the fighters for culture studies, and it can best do this by insisting that the bisectional scheme of living—sensing and perceiving followed by doing—is wholly inadequate to man.

Laws of Functional Activity. As remarked above, the aim of mental science, after ascertaining by analysis the functions of mind, is to determine the laws according to which they work. By this is meant a formulation in the most general terms possible of the conditions which are necessary to the carrying out of a functional activity and to its full development.

(*a*) Such laws may embody the general conditions of all mental functioning. Reference has already been made to the physiological conditions of mental processes, more particularly a vigorous state of the brain. This, it is evident, is a preliminary condition of all normal and effective psychical activity. Among the more general mental conditions Attention is, as we shall see, by far the most important. A certain focussing or concentration of mental energy is presupposed alike in all clear knowing, vivid feeling and energetic willing.

(*b*) Next to these universal conditions, there are more special ones having to do with some special mode of functioning. Thus there are special laws of intellectual process, as, for example, those of mental reproduction or the revival of impressions. Similarly, there are special laws of feeling, as that pleasure, in moderation, heightens mental activity. Finally, we have special laws of conation, as that effort decreases with repetition. So far as possible, in assigning the special conditions of feeling, knowing and willing, we should refer to the particular nervous processes involved.

Since mind is an organic unity, and its several types of process interact one upon another, a complete enumeration of conditions will have to make reference to such interactions. For example, feeling exerts a profound influence over ideas and beliefs. We are apt to think and believe

what chimes in with our hopes and fears, our likes and dislikes. In addition to favourable conditions we do well to note unfavourable or negative ones; *e.g.*, that all violent feeling, such as intense bodily suffering or passionate anger, is unfavourable to intellectual activity.

(*c*) Still more special conditions may be stated when we are dealing with a more special and concrete variety of process corresponding to what is popularly called the exercise of a particular faculty. For example, we explain a process of observation by specifying as its chief conditions, a favourable position of the object observed, a special interest in this object, and a certain preparedness of mind due to previous exercise. Further, a complete enumeration of conditions would include a reference to those past and it may be remote activities which are the pre-condition of carrying out the present process (*cf.* above, p. 46).

Bearings on Education.

How the Teacher makes Use of Results of Analysis of Mind. The process of psychological analysis just described has a direct and important bearing on the education of the mind. Every *intelligent* attempt to act upon another's mind must, indeed, be guided by some knowledge of its processes. An orator who knows what he is about understands something at least respecting the nature of an intellectual process as well as the difference between an intellectual process and a movement of passion. A teacher who desires to excite certain kinds of activity is more likely to do so effectively if he knows precisely the elementary functions which enter into them.

The new conception, already spoken of, that mental processes are reactions of an organism, the carrying out of certain functional activities which are appropriate to it, is important as correcting an old and erroneous conception of teaching. This latter viewed a child's mind as something passive, as a receptacle into which we can somehow

put ideas, or at best as a plastic substance on which as on wax we can stamp impressions. For all such *mechanical* conceptions we must substitute the *biological* conception that every interaction between mind and mind is an organic process, that in educating a child's mind we have to call forth, by a presentation of suitable stimuli, certain appropriate reactions. In getting a child to move his arm we do not act by mechanical processes on this organ (as when we lay hold of it and move it); but we excite its own proper activity by applying a stimulus to a connected sense-organ, as when we touch his arm or display an attractive object to his eye. In like manner, when we instruct his mind we present certain intellectual material, *viz.*, objects of sense or intelligible words, in order to excite those psychical reactions, attention, discrimination, etc., in which mental work consists. The idea that all intellectual processes are active functioning, reactions carried out on materials supplied directly or indirectly by the senses, affords a scientific basis for the educational maxim emphasised today, that in teaching we have to awaken the child's "self-activity".

To a precise conception of what is meant by a mental function or functional reaction the teacher must add clear insight into the nature of the several functions. This applies with special force to the elementary functions of intellect. I believe that every intelligent teacher will bear me out when I say that the introduction of psychological terms, such as discrimination and assimilation, to express fundamental activities of mind, is tending to revolutionise much of our educational work. The teacher thereby gets rid of the misleading idea of the mind as a bundle of distinct powers or faculties.

Again if, as has been said above, it is the business of education to take a large share in developing a child's mind and personality as a whole, a scientific analysis will enable us to know this mental organism better, to distinguish its several constituent lines of activity, and to appreciate all its valuable tendencies. A clearer recognition by teachers

of feeling as a primary function of mind will have important consequences for education. In truth modern educational literature is already beginning to recognise the importance of the feelings, both as a force in child-nature and as an element of human worth.

Use of the Synthetic Conception of Mind. While however this analytic view of a child's mind is of fundamental importance to the teacher, it is not sufficient. The synthetic view must supplement the analytic: that is to say, the teacher must get firm hold on the truth that the real living mind of a child is a unity, an organism, in which the functions which we mentally separate in our analysis are inseparably co-ordinated. Much of bad education in the past has been due to the want of this synoptic view, of the apprehension of the mind in its living concrete wholeness. We shall see by and by that dull lifeless teaching is psychologically wrong just because it ignores the truth that all intellectual activity is fertilised and sustained by feeling in the shape of interest. And just as the educator may go astray by overlooking the vital connection and interaction of intellect and feeling, so he may err by overlooking that of feeling and volitional effort, by forgetting, for example, that even the highest moral efforts must be inspired by warmth of feeling.

Value of a Knowledge of Conditions of Mental Activity. While the teacher needs this insight into the several mental processes and their connection, he needs further a clear understanding of the conditions of the normal and perfect carrying out of these activities. The new point of view, that teaching proceeds by exciting in the child's mind certain reactions, makes it necessary for the teacher to understand, first of all, the internal conditions of this "self-activity," and, secondly, how his action may modify these forces. Thus if I want to understand perfectly how I am to secure a child's attention for some object of sense, or some verbal description, I need to have, first, a theory of attention, that is, a scientific account of this activity and of its conditions, and secondly, a practical

insight into the various means by which I can act favourably on these conditions, as by selecting what is interesting, by awakening curiosity, and by counteracting the forces which make for inattention.

NOTES.

NOTE A (p. 46).—The term apperception has been used in many different ways, but on the whole it seems better to adopt the above view of its relation to the usually recognised psychological processes than to attempt to identify it with any one of them. A full account of the meaning and history of the term will be found in *Apperception* by K. Lange (American translation, Heath & Co.).

NOTE B (p. 47).—*Functions and Faculties.*—There was once a psychology which considered its task to be to account for all our mental operations by a complete classification of our "faculties". That psychology is long since dead, but a word or two upon the cause of its decease may still be useful. First, it had a tendency to suppose that when it had asserted a particular mental act to be due, say, to the "faculty of reason," it had thereby explained the act in question. In reality "faculty of reason" meant nothing but the power or capacity by means of which the mind produces results like the one to be explained, so that we knew just as much before the "explanation" as after—or rather more, since we at least knew before that we had not explained the matter. This point is emphasised here for the reason that we are not safe against the fallacy merely by avoiding the word "faculty": any other term, such as "function," can quite as easily be misused with the same results. We must bear in mind that to name a thing is not to explain it unless the name helps to exhibit it as a particular case of some general rule. Moreover, there *are* such things as mental faculties, and the name "faculty" is often a convenient one to which there is no objection so long as it is not supposed to explain anything. But what may properly be named "faculties" cannot be made the basis of our psychology, for the sufficient reason that they are not psychological divisions at all. That is to say, two processes classed together as instances of the same faculty may be found on introspective examination to have little or nothing in common. They are ascribed to the same faculty because they produce similar practical results, though similar results may be produced by the mind in very different ways. Thus the "faculty of memory" means any and every process by which the mind reproduces past experience, regardless of the nature of the experience or the manner of its reproduction. For psychology the operations of memory and the other faculties are complex, concrete processes, each made up of a number of psychologically simple and abstract ones, which are not always the same or combined in the same way in the case of the same faculty. The relation between a faculty and a function (*i.e.*, psychologically simple process) may be compared to that between a "single movement," such as one step in walking, and one of the

several muscular contractions of which it is the resultant. From the practical point of view which regards the results, such a movement may be considered as simple, but from the scientific (physiological) point of view it is complex, depending on the due co-ordination of a number of nervous and muscular processes.

CHAPTER IV.

MENTAL DEVELOPMENT.

In the last chapter we took a general survey of the system of activities which constitutes a mind, without reference to the successive stages of their development. We have now to inquire into the history of this mental organism, to ask how it comes to be the complex mature thing which we can study in ourselves and other adults. This historical or genetic treatment of mind, and more particularly that part which traces the course of its early manifestations, will be found to be of the highest interest and value to the teacher.

General Account of Mental Development. The chief constituent processes of all organic development have been described above (p. 31), and the reader is advised at this point to recall that description to mind; for mental development, which proceeds concurrently with cerebral development, is in its essentials similar to that of a physical organism. The mental life begins with each of us as a state of vague, undifferentiated "sentience" or sensing. The life before birth (fœtal life) is, so far as we can conjecture, a state of semi-consciousness, *i.e.*, a kind of drowsy or somnolent state, which is only occasionally disturbed by the intrusion of a sudden shock of rousing sensation. Even after birth, when the higher sense-organs come into play, we have at first to do with a confused semi-conscious state, in which sights are hardly distinguished from touches, and perhaps only the contrast pleasure-pain begins to be clear. Then there emerge the broad contrasts within the sense-life, darkness and light, silence and sound, rest and movement. The different kinds of impressions are

only gradually distinguished, visual from auditory, warm and cold touches from other touches, and so on. Long before perceptions of objects grow clear, sense-impressions, such as that of a bright object, produce changes of consciousness, which amount to crude experiences, though they are not realised as "mine," nor definitely connected with an external world. The discrimination of the "me," and the "not me" is very gradual. There will be the first glimmering of space relations, as of up and down (when the baby is tossed), but no mapping out of the spatial world with its relations of right and left, before and behind, etc.

Development means the gradual displacement of this confused drowsy state by a clearer wakeful state, in which differences or changes are noted and impressions take on definiteness, *e.g.*, as sights, and later as particular colours. Along with these differencings there go integrations, organic processes of complication by which simple forms grow more and more complex. Thus particular groups of sensations which recur again and again, *e.g.*, the visual sensations corresponding to the mother's face, begin to take on meaning and to be recognised as caused by something external, or an "object". On the other hand, bodily sensations, *e.g.*, those of hunger and its satisfaction, of heat and cold, with their marked affective accompaniments, take on another meaning as changes in "my" condition. Later on, ideas are gradually formed out of perceptions, and these too are brought into connection one with another, as when the idea of falling is associated with that of a blow. In this way still higher intellectual processes, those of thought, are prepared for. At the same time, each strand in the mental life is being interwoven with other strands, feeling with thought, and both with volition, in a consistent and harmonious fabric.

The Biological Theory of Mental Development. This typical course of the mind's development is, as already pointed out, dependent upon the processes of bodily development. The close connection between these changes and the development of the nervous system has already

been pointed out (see pp. 32, 36). The nervous system was, moreover, at the outset described as the mechanism by means of which an animal responds to, or adjusts itself to, its surroundings. We have seen, too, that as both impressions and responses become differentiated and integrated, the responses vary more according to varying impressions, and impressions of greater complexity lead to more complex reactions; that is to say, adjustment becomes more complete.

Mental development in man, however, goes much further than the stage at which complex impressions or "objects" produce complex movements. At this stage—"the perceptual level" as it has been called—the responses are to present sense-stimuli only; but at a later stage, as we shall see, the development of reproductive and constructive imagination, and still later of conceptual thought, enables us to become ever more independent of the sense impressions of the moment, and, by mentally constructing future events and distant scenes on a basis of our past experience, to adjust ourselves to an ever greater area—in a temporal as well as spatial sense—of our environment. Thus we write a letter to secure an engagement to-morrow; we put by for the future; our feelings and conative efforts direct themselves to larger and more permanent forms of good, such as friends, art. As has been pointed out (p. 49), we gradually organise a mass of experience or knowledge which may serve for future practical guidance, though what may be the particular applications to be made is wholly unknown to us. In the case of systematic scientific study we do not even know that the knowledge gained is likely to lend itself to practical application. It is no doubt true that the biological conception of knowledge as leading to appropriate reactions does not lose its validity, even in respect of knowledge pursued for its own sake. By substituting the point of view of the race for that of the individual, we may say that the progress of knowledge always subserves practical living in the sense that, even when a portion of it is in itself not directly applicable to

practice, it may constitute an important link in the whole chain leading on to further knowledge which can be directly applied. In this way the biological or practical point of view in estimating the value of knowledge may be retained (Note A). But the retention of it, so far from being adverse to the erection of knowledge and theoretic interests into things of great and intrinsic value may be said to require us to love knowledge for its own sake, seeking it always and by all means without any *arrière pensée* of its being likely to be of practical use to us.

Individual and Race Development. We have already seen (p. 30) that there are two kinds of development. Every organism belongs to a race or species, and this species represents the type to which, when it reaches maturity, it will approximate. Thus we know that a kitten must, if it lives, grow up into a cat, and not into a panther. That is, the present type of the species is the same as, and in some degree determines, the form of the adult individual. But the various species are themselves, as we all know nowadays, the latest stage of an immensely long process of development or evolution. If we could trace the history of all these forms backward we should find them gradually converging, as the branches of a tree converge towards its stem, until we reached one elementary type of organism consisting of a single cell of living matter. But the first stage in the life-history of every individual organism is also such a simple unicellular structure. The beginning and end then is the same in both kinds of development, and there is good reason to suppose that in their intermediate stages also the two in the main correspond. The development of the individual from inception to maturity may be said (with some qualifications) to recapitulate the main stages in the previous development of the species. Thus a comparison of the embryos of various species and genera at different stages in their development shows that these differ far less than the mature organisms, and that this difference grows less and less as they are traced backward, until at an elemen-

tary stage the embryos of, say, man, the pig and the tortoise, are practically indistinguishable.[1] Even after birth the human infant has many striking resemblances to what we must suppose to have been the last pre-human stage in the evolution of man. Thus its arms are very long in proportion to its legs, while its feet are habitually turned inwards and seem as much suited for grasping as for walking. In spite of its general helplessness it can hang by the hands from a horizontal bar for some minutes.[2]

In its mental life, too, as far as we can judge of this, the young child has much in common with the higher animals and comparatively little that is distinctively human. Its earliest reactions are, as we shall see, largely non-voluntary, resembling the instinctive actions of animals, and for a long time it is confined to the world of sense, memory being as yet weak and unimportant, and the higher kinds of intelligence almost non-existent. Even after these have begun to appear and the partial conquest of its first modern language has stamped the little creature as distinctively human, many of the characteristic forms of its intellectual activity, such as the fanciful transformation of objects of perception, the belief in fairies and other supernatural beings, have their parallel in the ideas and beliefs of savages, who are supposed to represent roughly the early stages of the life of the race. This kinship between the child and uncivilised races is particularly striking in the case of children's drawings.[3]

This principle of the recapitulation of race development by the individual has been made much use of in modern theories of education. More especially, direct application has been made of that extension of it known as the *Culture-Epochs Theory*, to be spoken of presently.

Another important point in the biological theory of childhood is the exceptionally long time required for the development of a human organism and its mental aptitudes.

[1] See the diagrams in *The Darwinian Theory*, by G. J. Romanes, p. 152.
[2] *Cf.* Romanes, *op. cit.*, pp. 79, 81.
[3] See *Studies of Childhood*, chap. x.

If we take a member of one of the animal species, *e.g.*, a dog or a cat, we find that within a year or so all the main stages of development, both bodily and mental, have been run through. The human offspring, on the other hand, requires many years for going through its series of developmental changes. This difference is connected with the fact of the great complexity of human life as compared with animal life. A dog requires for the discharge of its life-functions but little experience, and, being well equipped with a number of useful instincts, develops its brain quickly; human intelligence, on the other hand, is far greater and depends far more on the gradual acquirement of experience. From the physiological point of view the same thing may be expressed by saying that the human brain is relatively very large, and whereas it is at first but little developed, it has ultimately to reach a condition of much greater complexity than that of any animal. Accordingly its development takes much more time.

One feature of this prolongation of the period of mental development in man is of especial interest, *viz.*, the lengthening of the period of infancy, with its extreme dependence on others. It follows from the very complexity of the process of normal development in man that a child must remain for a much longer period than the offspring of any other species helpless and dependent for its maintenance and security on others. It seems probable that in the animal scale the duration of the period of infancy increases with the complexity of the organism.[1]

Heredity and Environment. There is, as we have seen, a tendency inborn in every young organism to develop in a certain direction, to approximate to a certain type. The kitten will become a cat, the baby a man. This is the principle of Heredity in the larger sense, the tendency to conform to the type of the *species*. In addition to this, heredity implies a tendency to conform to a smaller and

[1] For a fuller account of the new view of infancy, see Prof. N. Murray Butler's volume, *The Meaning of Education*, pp. 6 ff.

more specialised group: *e.g.*, the cat to that of a Manx cat or a Persian; the baby to that of an Anglo-Saxon or a Papuan. A still narrower form of this conservative tendency is seen in family heredity, that is the inheritance of distinctive characters of a family.

According to one view a boy tends to develop not only the fundamental mental characteristics of his species but also some result of the exercise and development of capacity by his ancestors. That is to say, he reaps—in a slightly increased inherited equipment—some benefit from the mental exertions of his parents, etc. This theory is an alluring one to the teacher since it certainly assigns a larger scope to education. It tells him that in training boys of the present generation he is furthering the innate capacities of its successors. At present, however, biologists are on the whole unfavourable to the theory of the inheritance of "acquired characters," and so of the transmission of acquired increments of mental capacity. Yet the wise teacher may reflect that to help to form intellectually and morally one generation of human beings is a task sufficiently large (see Appendix A, "Heredity and Acquired Characters".)

If this repetition of ancestral characters had been exact, however, the different species as we know them could not have arisen. Opposed to the conservative principle of heredity is the tendency to variation. The individual never repeats exactly the type of its parents, or of the family, or of the race, but only *approximates* to it: in other words, it tends to vary or differ from the old as well as to resemble it. This tendency to variation is indeed itself quasi-conservative, for the variations will in general be partly a continuation and increase of the parents' variations from the larger type. But partly the tendency will be towards the altogether new and original (Note B). Thus the type to which the individual is tending will be partly old and partly new.

Even if we could determine beforehand the exact nature of this result, it would still be impossible to say how far it would actually be attained. For we have been

speaking of what is a tendency only, the working out of which may be hindered or changed in many ways by external conditions. In the most unfavourable circumstances the creature will die before reaching maturity, and between this extreme case and the most favourable conditions allowing of full and perfect development, there is an indefinite number of degrees. The circumstances, or conditions of life of the organism, taken in the widest sense so as to include every kind of external influence, are called the *Environment*.

The final form of the mature organism will thus depend upon three factors: (1) inherited characters and tendencies; (2) congenital variations; (3) the environment. Or, putting (1) and (2) together, we may say that it is the resultant of the interaction of the *internal* and *external* factors.

As to the relative importance of these factors little can be said. The effect of the first will be practically constant and inevitable, in so far as the more general race characters are concerned; that is to say, the normal baby will become a human being. As regards the more particular characteristics of the family or parents, the action of heredity will be less certain and constant. It seems probable that the second factor (variability) is greater, the more complex and highly developed the organism; and, if so, it would of course be relatively strong in man. At the same time man is peculiarly affected by the third factor (environment), for, as we have seen, man has much more of what Prof. Royce calls "docility," of the power of modifying his reactions and of adapting himself to circumstances than have the lower animals. Instead of being endowed with highly specialised instincts, which are the result of a high degree of racial adaptation but admit of little modification by the individual, he has to learn by experience. That is, he can react to any situation in a number of ways, and can determine the most advantageous way by drawing upon that accumulated body of general knowledge gained by trial, failure and success of which we have already spoken.

Psychological Scheme of Development. We have now to bring together rather more systematically what has been said about mental development in preceding sections. In so doing we shall confine our attention at first to the intellectual side of mental development. To begin with, then, it is obvious that a part of what we mean by intellectual development is expressed in the saying that every functional activity of mind, as well as of body, tends to perfect itself by repeated exercise. A child's mind pushes on in the path of development by gradual improvements of its elementary activities, such as attention to sense-presentations, and discrimination and assimilation of these. When, for example, the child has learned to discriminate two colours, say green and red, he will be able to discriminate more finely, as between yellow and orange. This gradual improvement of the several modes of functional activity is, however, not all that we mean by the development of the intellect. As pointed out above, development means a passing from earlier simpler forms of intellectual process to later and more complex forms. And in this transition we are able to mark off a number of fairly distinct stages of intellectual development, which emerge in the following order:—

(1) The starting-point of the intellectual life is that vague sentience which, as we have seen (p. 56), probably begins some time before birth and which only gradually gives place to distinct Sensation. In other words, the beginning of the intellectual life is the supply of that sense-material which the intellect elaborates according to its own laws. A child knows nothing about the external world until the senses come into play, and convey impressions of its colours, forms, sounds, etc. Along with sensation we have to take movement, which we have seen to be organically connected with it. (2) Out of Sensation arises the first stage of cognition proper, *viz.*, the process of Perception, (sense-observation), in which a particular group of impressions is discriminated from other groups, connected as a whole, and recognised under the form of a thing or "ob-

ject". In this way a child learns to know its ball on seeing it, on touching it, or on hearing it bounce. (3) Perception again is followed by a gradual emergence of Imagination, the process by which the mind pictures or images what is not at the moment actually presented to it. Such imagination may be either direct, representing what has been perceived in its original form (Reproductive Imagination), as when a child in the dark recalls the face of his mother; or it may be indirect, involving the representation of sense-objects in new and altered forms (Productive Imagination), as when out of the images of his maid and his sister he forms the new image of Cinderella. This stage is already an advance beyond the "perceptual level," which may be said to correspond roughly with that of animal intelligence. (4) Finally, there gradually appear those highest forms of intellectual process, *ideation* in the complete sense, that is, the formation of elaborate ideas which enter into Thinking properly so called. It is these highest processes alone which make possible the construction of that system of reasoned or scientific knowledge to which reference has more than once been made.

Our intellectual life is then ever moving farther away from its starting-point, *viz.*, the senses. The process of elaboration begins with attention to and assimilation of impressions; it passes on gradually to processes (imagination and thought) detached so to speak from the work of the senses; or, as it may also be expressed, our intellectual progress begins with sense-*presentations*, and moves towards pictorial or other *representations* or internal substitutes for presentations. And the more the progress advances the farther is this process of substitution carried; memory-images being more closely related to percepts than are those images which involve a considerable amount of transformation, and these last again more nearly related than are elaborate ideas.

In order to avoid misapprehension, a word or two must be added in explanation of the above scheme of development. In speaking of the life of imagination following

the life of sense-observation, and of ideation and thought following the pictorial imagination of concrete things, psychologists do not mean that there is first a period, say that of infancy, wholly given up to sense-perception, that this is followed by another wholly given up to imagination, and so forth. What is meant is that the higher processes emerge in a distinct form later than the lower. But the germs of the higher may be discovered in the lower; thus, for instance, the "meaning" which enters into our perceptions constitutes the germ of the "free image," as will be explained later. Moreover, after the development of the higher forms the lower still continue, only the expansion and strengthening of the higher activities tend to make them preponderant so that they restrict the range of the lower. On the physiological side the development of the nervous arcs of the higher levels has an inhibitory effect on those of the earlier and lower levels, although these still exist. Many reflex actions are thus totally or partially inhibited under normal conditions but reappear (as in the case of the man with a severed spinal cord) when the functioning of the higher arcs is prevented or the two levels are disconnected.

Again, not only do the higher activities to some extent restrict the lower, they also combine with and modify these. Thus, for instance, when we recognise a friend we really have a more or less clear awareness of the relation of identity between what we see now and what we have seen before. This is implied in our saying that what we see is the same person, with a continuous individual existence and a number of abstract qualities. And all this must be discounted and put on one side in determining what is essential to recognition or assimilation in its simplest form (*cf.* above, p. 45), since it is the result of intellectual processes belonging properly to a later and higher stage of development. So when I "see a fire engine" my sensations interpret themselves in terms of knowledge due to previous experience and thinking; otherwise I might behave like the baby who crowed with

pleasure at the sight of his burning home and cried with terror at the sound of the approaching engine.[1] Such modification of immediate experience by the previously acquired content of the mind is an instance of apperception (see above, p. 46).

If now we take together the improvement of the intellectual functions by exercise, and the advance from sensation to perception and the other stages, we see that they involve the two great characteristics of all development, growing integration and complexity of form and growing differentiation and definiteness of form. With respect to the first it is sufficient to point out that at each stage there is an increase of complexity; our perceptions grow more complex, taking in a larger area of objects and more details within this area. Similarly, ideas become integrated into longer series. At the same time the transition from sensation to perception and from perception to ideation involve each a stage of elaboration and integration, a number of sensations being organised into a perception, a number of perceptions elaborated into an idea. With regard to definiteness, too, it may be said, not only that our perceptions, our ideas, etc., grow severally more precise and distinct, but that the higher stage of thought serves by its analysis to bring a new distinctness into our concrete experience.

Mental Development and Plasticity. In the course of our preliminary analysis of mental functions it was pointed out (above, p. 46) that the mind is permanently modified by its own activity. To have distinguished two colours makes it easier to distinguish them again; to have burnt its finger in the candle makes the child more careful next time, and so on. Every thought, action, experience of any kind must leave some permanent effect. We may indeed be quite unconscious of any such modification, or we may be aware of the modification and be unable to explain it. Prof. Judd[2] tells us of a man who could not bear

[1] W. James, *Talks to Teachers*, p. 162 (from B. Perez, *First Three Years of Childhood*, p. 64).

[2] *Genetic Psychology for Teachers*, chap. ii.

horses, but could give no reason for his dislike until he learnt that he had been bitten by one as a child.

This property of the mind is evidently an indispensable condition of mental development. Without it, no profiting by experience, no learning of any kind would be possible, since our every experience would be but "writ in water". As it is, every operation of the mind leaves behind it a permanent "trace" or "disposition". These expressions are, it should be noted, not in any sense explanations but merely convenient terms for denoting the fact that an experience does, somehow or other, modify succeeding experiences. These dispositions have their physiological aspect also; that is, the nervous activity which accompanies all psychical activity in some way modifies the part of the nervous system concerned, and this modification in turn modifies the nature of its future activity. Although there is no direct physiological evidence of this, there is no doubt about the fact, and it is certainly easier to form a conception of the possible manner of working of the dispositions on the physiological side, since here we have the connecting-link supplied by the continuously existing nervous organs, while on the psychological side there seems no such link between the burnt finger now and the sight of the candle twenty-four hours later.[1] For this reason some writers would prefer the term "physiological disposition" or "psycho-physical disposition," while others, insisting on the strictly psychological point of view, prefer "psychical disposition".[2]

This general modifiability of the mind by experience, which we have called plasticity, has two main sub-divisions, (*a*) Habit and (*b*) Retentiveness (Note C).

(*a*) **Habit and Development.** When we have once performed a series of actions or a complex action consisting of a number of steps, the "disposition" thereby created will make the carrying out of the series easier on a subse-

[1] *Cf.* McDougall, *Physiological Psychology*, pp. 118-24.
[2] *Cf.* Stout, *Manual*, bk. i., chap. ii., § 13.

quent occasion, and will produce a tendency to carry it out in just the same order and manner. These effects will be intensified as the disposition grows stronger with every repetition of the series. Such a tendency to repeat a series of mental acts is called a *habit*.

Habit represents, then, in our mental life the effect of custom, the conservative tendency; it means the fixing of mental activity in certain definite directions, and is, so far, opposed to development in the sense of further adaptation. But mental development as we know it means two things, the capability of further modification by new experiences, and a tendency for previous experiences to keep future functioning in the special lines of the old. That is, development means change, progress; but since each step forward must be on the basis of what is already achieved some amount of fixity, resistance to change, is necessary. Plasticity, as Prof. James puts it, "means the possession of a structure weak enough to yield to an influence, but strong enough not to yield all at once".[1] Habit, then, like heredity, makes for continuity in development.

(*b*) **Retentiveness.** In the case of habit a past experience modifies a present one, facilitating and as it were stereotyping it; the past experience does not, however, itself reappear in consciousness or even add anything to the new experience. Retentiveness means more than this, namely, that the past experience modifies the present, making it a fuller experience than it would have been but for this effect. This again may assume two forms, implicit and explicit revival. The former is illustrated in the incorporation into a perception of a new element of meaning; as when a child having felt the sharpness of a knife-blade afterwards *sees* its edge as sharp. The latter, which is revival in the fuller sense, implies that the past experience is (wholly or in part) reproduced in the free detached form of an image, as when the sound of the dinner-bell calls up a mental picture of the replenished dinner-table.

[1] *Psychology*, p. 135.

This latter process, the revival of sense-presentations, is of great importance since it underlies the transition from the lower intellectual levels of sensation and perception to those of imagination and thought. The rise of free images marks, as we shall see, an epoch in a child's development. For it is only when they appear and become steady and well defined that he is able to revert mentally to his past experience, to compare the present with the past, and to begin to arrange and classify things according to their common characteristics.

These processes of reproduction depend, as already pointed out (p. 45), upon the integrative work of association. When a child has an image of his absent mother it is because this image is commonly suggested by some associated presentation, such as the sound of her voice, or the appearance of her empty chair.

Development of Feeling and Willing. While for the sake of simplicity we have here confined our attention to the development of intellect, we shall see later that the same features and the same underlying principles are observable in that of feeling and willing. The earlier feelings, the so-called "bodily" pleasures and pains, are at the sense level; others, *e.g.*, a simple emotion of fear, at the perceptual level; while yet other feelings, as regret, self-satisfaction, are at the levels of imagination and thought.

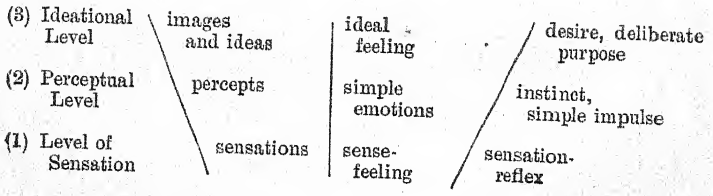
In like manner we shall find that the successive stages of conation move from those immediate responses to sense-stimulation which we call bodily movements, such as grasping an object with the hand, up to the type of voluntary action which involves a good deal of the internal and representative element of *ideation*, as in aiming to win a distant prize.

It will be found further that these directions of mental development, like that of intellectual progress, illustrate a growing definiteness and complexity; also that, as in the case of the intellectual processes, there is an unbroken continuity in the movement of development. The higher

forms of feeling and of conative process emerge gradually out of the lower. So too the higher forms of these processes when fully developed have a reflex moderating influence on the lower. This will be seen more particularly in those regulative actions of will which we call control. Finally, the same general conditions, *e.g.*, repeated exercise, retentiveness, differentiation and complication, will be found to be illustrated here as in the case of intellectual development.

Interdependence of Different Phases of Development. Since mind is an organic unity, we may expect to find that the developments of these phases of mind are closely connected. Thus, the development of intelligence involves at each stage a certain development of feeling and of active exertion. A child would make no progress in knowledge if he had no interest in what he is learning; which interest means a certain kind of agreeable feeling, sustaining a conative impulse. Conversely, the life of feeling grows rich and varied through the accumulation of knowledge about nature and man; and all the higher processes of volition wait, so to say, on the development of feeling and the acquisition of practical knowledge. Thus, although it is no doubt true that a child's mind may develop in a one-sided way, that is to say, more on one side than on the others, it is equally certain that development in any one direction implies a measure of development in the other directions.

The mutual relations of the three phases of mental development may be roughly illustrated by the following diagram:—



Factors in Mental Development. We have seen (p. 63) that two factors may be distinguished in the development of an organism, one *Internal* and the other *External*. The first of these includes all the congenital characters and tendencies of the organism, whether due to heredity or to variability; the second is the same as the organism's environment. It is by the interaction of the two factors that development advances. The same is true of a human mind. A child's intellectual activity and his impulses towards movement are aroused by the action of surrounding objects on his senses. To this must be added that the human individual realises himself intellectually as well as morally only so far as he comes into contact with others, and is acted upon by their thoughts, feelings and actions, while in turn he adjusts his thoughts, etc., to theirs. We may say, then, that the typical process of development of a human mind implies two things, (*a*) normal congenital capabilities, and (*b*) suitable surroundings.

(*a*) **Internal Factor.**—Keeping for the present to the common typical plan of development, and ignoring its variations, we may say that this process presupposes, first, all that is included in the congenital aptitudes and dispositions of a human being. Thus it plainly includes the several simple modes of sensibility, to light, to sound and so on, in their normal forms. Further, it embraces the germs of those capabilities which we have called intellectual functions, *e.g.*, discrimination and assimilation. In like manner it will include the primary or fundamental capacities of feeling, *viz.*, susceptibility to pleasure and pain in its simpler forms, as well as the instinctive impulses to act which form the natural basis of conation. These last must be taken to include the child's instinctive impulse towards development, the natural basis of the desire to grow in knowledge, power, and so forth. It is scarcely necessary to add that the congenital basis of what we call a normal human mind will include a normal bodily organism, and in particular a healthy and vigorous nervous system, organs of sense and of movement. The importance of this equipment is suf-

ficiently illustrated in the total arrest of mental development which accompanies deficient brain-power, and the great restriction of the process which results from a serious impairment of the sense-organs or of those of movement.

(*b*) **External Factor.** (1) **Natural Environment.** This primitive and congenital organic basis being assumed, we require further the presence of appropriate external conditions and agencies. The growth of a child's intelligence presupposes the forces which act upon the sense-organs and excite what we call sense-impressions, together with space or room for those movements, which, as we shall see, contribute to our knowledge of material objects. Deprived of these external conditions, a child's congenital disposition to form perceptions and ideas of things would remain undeveloped, his rudiment of mind would remain but a rudiment. The importance of these environmental agencies is strikingly illustrated in the famous history of Kaspar Hauser, the German boy who, brought up in darkness and solitude, with but few objects of sense to arouse mental activity, had by the age of sixteen hardly reached a higher mental level than that of a baby.[1]

(2) **The Social Environment : Language.** In addition to what we commonly call the Natural or Physical Environment there is the Human or Social Environment. By this we mean the community, of which every individual child is a part, to which from the first he is bound in certain relations of dependence and obligation, and by which his whole mental life is profoundly influenced.

This influence of the community upon the individual is not confined to man, but operates to a greater or less extent in the case of all animals, more especially, of course, in the case of those which are gregarious. Tradition, through imitation and instruction, plays a considerable part in the formation of many habits commonly spoken of as instinctive. Thus linnets brought up by a lark acquired

[1] See, for example, the story of Kaspar Hauser in *Chambers' Encyclopædia*, or, better, in the *Quarterly Review*, 1888.

the song of the latter.[1] Again the infectiousness of fear among many animals is striking, and no less so is the calming effect of its absence; the young horse in double harness with an older and steadier one will be undismayed by monsters of mechanism that would give him an acute attack of nerves if alone. In this way the habits and experience of one generation can to some extent be handed on to the next, and the young animal is provided with a short cut to wisdom that could otherwise only be acquired through painful experience. Such handing on of race-customs, etc., through imitation and tradition has been called Social Heredity.[2]

The influence of the social environment is, however, vastly greater in the case of man, since he is a social animal in a sense in which no other creature is; and this in its turn is possible largely through his possession of an instrument of communication of quite another order than imitation. This instrument is of course *language*. By its means teaching becomes explicit and general and can go beyond the personal experience of both teacher and pupil; for by its help the teacher can prepare the pupil for a situation before it arises, and even for one in which he himself has never been placed.

Language is, moreover, of vital importance in mental development in another way. There are instruments which are not only valuable by the results that they achieve, but whose very construction and working are suggestive and instructive. So it is with language, which has been happily called the crystallised thought of the past and "a thought-record of the progress of the race".[3] By coming in contact with it from the first months onwards a child gradually assimilates the thought-distinctions crystallised in its forms—the ideas of "thing," "self," the relations of cause and effect ("he did it"), reason and consequent ("why," "because"), and so forth.

[1] Lloyd Morgan, *Animal Life and Intelligence*, p. 454.
[2] Prof. Baldwin, *Development and Evolution*, p. 39.
[3] N. Murray Butler, *The Meaning of Education*, p. 20.

The importance of the social *milieu* for full normal development could only be ascertained with precision by trying the cruel experiment of withdrawing a child from all social influence. Even Rousseau's Emile was not treated so badly as this. The stories of children left to run wild in the woods may be more or less apocryphal: yet they at least show how the popular intelligence conceives of the dependence of the child on a social environment. Teachers at any rate are not likely to overlook the importance of these human surroundings: their way of speaking of it as *the* environment sufficiently shows the special value they attach to it. Rousseau's strange idea of isolating a child was due to his inadequate recognition of these humanising influences, an oversight which came from his exaggeration of the evils of civilisation.

Undesigned and Designed Influence of Society. A part of this social influence on the unfolding mind of a child works undesignedly, that is, without any intention on the part of the parent or other companion to accomplish a beneficial result. A child will spontaneously assimilate our forms of language, modes of reasoning, and even our likes and dislikes. From this unintentional action of the human surroundings we must distinguish that designed action which in its more elaborated and systematic form is education properly so called. This action begins in a loose way from the first year, as when the mother shows things to the child, or gives the name of an object. Along with intellectual control there goes a rude kind of moral control, beginning by checking "naughtiness" with a "Hush!" or by welcoming a dutiful action with a kiss, and gradually growing more extended and more systematic.

Both the undesigned and the designed kind of social influence are needed for the development of each of the three great phases of the mental life. Kant taught us—what Rousseau had just before sadly failed to see—that every individual becomes human by education, that in order to the full realisation of human capability and human

life each of us has to be subjected to the educative influence of the home and the community. The intelligence of a child grows, partly by unsolicited responses to the social intelligence as this reflects itself in the forms of language, in traditional sayings, etc.; and partly by the aid of a more or less systematic instruction. Similarly, feeling develops partly through habitual contact with other minds and the play of sympathy, and partly through direct appeals from others. Finally, the will develops partly under the silent, scarcely noticed influences of example, and partly under the educative forces of encouragement and discouragement, praise and blame.

Growing Interaction between Child's Mind and Environment. This action of the environment, both physical and social, increases in range as the child's mind develops. At first a child is acted upon by, and reacts upon, only a few objects, those which happen to lie near at hand, and which attract him by their striking colour or other interesting feature. As he grows he will observe a larger and larger number of objects, such as the hills far off, the sea he visits in the summer. Similarly, as he grows, he will be touched by, and react to, a larger and larger social environment. The influence of the home, and the adjustment of actions to those of its rulers and its playmates will be supplemented by the wider influence of the school, of friends, and of public opinion, and this will give rise to a much more complex self-adjustment of the individual actions to the community.

Not only do the environment and the mind thus expand concurrently: they expand together. It must be remembered here that when we speak of an organism in an environment we do not mean two material things regarded apart: the terms are strictly correlative ones. The environment is not all physical objects or all human beings that happen to surround a child, only those that come into a vital relation with him, acting upon him in some way. Similarly, the organism means not merely this group of bodily structures, but a body endowed with functional

capacities and tendencies which relate it to its environment. All through the process of development there is a continual *interaction* between mind and environment. Not only does the environment stimulate observation, thought, reaction, but the living mind reacts on the environment, and this in two ways: (*a*) It alters its surroundings by way of bodily movements—*e.g.*, by walking from one room into another, by fetching a picture-book; (*b*) by selective attention it determines what particular agencies in the environment shall effectually influence it. The boy-painter in a family is surrounded by the same things as other members of it, but because of a special interest in colours and forms he observes things which the others do not observe, and so practically creates his own individual environment within the common one. Similarly, the child helps to determine the effective influence of his human environment by selecting his models and his companions.

Varieties of Development. While all normal human minds pass through the same typical course of development, there are countless differences in the details of the mental history of individuals. A closer study of these differences will be made at the close of our exposition. But in dealing with the general theory of development, together with heredity, etc., it is necessary to consider the more general and deeper-lying causes of individual variation. In doing so we shall be keeping largely to the biological point of view.

These divergences may be referred to one or both of the two factors distinguished above, *viz.* (*a*) variations of congenital tendency, and (*b*) differences of environment, physical and social.

(*a*) **Differences of Congenital Tendency.** The theory of heredity outlined above (p. 61) implies on the mental side congenital differences of mental capacity and disposition among children. These may be inherited in the sense that they are reappearances of special characters of a family; or they may, so far as we can trace them, be new variations, modifications which in their particular forms and combina-

tions serve to make the child an original individual.[1] That children exhibit these individual peculiarities, *e.g.*, of movement, sense-acuteness and the rest, is known to every intelligent observer of them. Yet while we may know this in a general way we should find it hard to say at even as early a stage as the third year how far the differences observable are to be set down wholly to differences of congenital tendency. The action of the environment begins from the first, and parental training is a great modifying factor even during the period of infancy. Although, however, it may be impossible altogether to eliminate the effect of early influences, yet we can reduce this to a minimum by taking a child soon enough, and by carrying out our observation in a methodical and scientific way.

Such investigation applied to young children has already begun to confirm the opinion that they are at birth endowed with very unequal degrees of capacity of different kinds. According to this view every child is—as an individual—something unique: an example of a particular group of aptitudes and tendencies in certain proportions of strength (which has never appeared before and never will appear again). This peculiar grouping of aptitudes and tendencies constitutes what is popularly styled the child's nature, but is better described as the congenital basis of individuality.

These congenital differences are further important as determining what constituents of the environment shall act upon the senses. This selection of environment is more apparent in cases of children of distinguished ability, such as the born musician or other artist. But it can be observed in a less striking degree in commonplace children too. These observations make it probable that if we could place two children in precisely similar surroundings, they would not be acted upon by these in precisely the same way.

Heredity and Individuality. According to modern

[1] On the relation of heredity to these individual differences, see E. A. Kirkpatrick, *Fundamentals of Child-study*, p. 11.

science these congenital differences of mental characteristics are, in part at least, illustrations of the principle of heredity already touched upon. We can sometimes trace throughout the members of a family certain common features of face, gesture, voice, etc., as well as mental and moral characteristics. Such distinguishing traits, moreover, though not observable in all members of a family, may reappear now and again. An interesting example of this recurrence is to be met with in the transmission of a definite kind of talent through generations of a given family, as for example, high musical ability in the Bach family.

It is evident, however, that the members of one and the same family show marked diversities as well as similarities. We often remark, indeed, on the striking contrast of ideas, feelings and inclinations among brothers and sisters. How far such contrasts may be only another illustration of the action of heredity, some member of the family representing the traits of one parent or remoter ancestor while another member represents those of the other parent or another remoter ancestor, we cannot say.

It follows that while the knowledge of a child's family history is often of great service to the teacher, as it is to the medical man, in enabling him to understand the re-appearance of certain characteristics, its value is as yet greatly circumscribed. In much of what constitutes the idiosyncrasy of a child we can see only the result of that tendency towards variation, or fresh modification of type, which has been referred to above.

Varieties of External Influence. While congenital peculiarities of mind thus play a considerable part in individual development, they are not the sole agency at work. In the case of average children, at any rate, differences in the surroundings, the physical and still more the social, have much to do in determining those differences of ability and disposition which manifest themselves at an early age.

The important thing to bear in mind here is that no two children ever come under precisely the same environmental

influences. Even twins have from the first a somewhat different social environment. Their mother is hardly likely to feel towards them, or to treat them, in quite the same way, and others are wont to show this divergence of feeling and behaviour very much more. These dissimilarities in the action of the environment must be allowed for, even though the amount of divergence in the lines of development may be much greater than the amount of the dissimilarity in the environmental action. As the years advance the sum of the external influences which help to differentiate individual character increases. The school, the place of business, the circle of friends, and so on, all contribute to determine the development of the particular stamp of mind and character of the individual.

That even slight differences in the surroundings must produce a certain effect follows from psychological laws. The mind develops by interactions with the environment, by responding actively to its stimulation, by assimilating its nutritive material. The lines of its growth will no doubt be broadly limited by congenital capabilities and tendencies, including those special dispositions to select environments which have been spoken of above. Yet these do not exclusively fix the lines of development. Thus, a child may have a considerable natural aptitude for painting or music, and yet in the absence of a favourable environment miss the attainment of a musical faculty. The same is true of the development of moral traits. A natural kindliness of disposition will not grow into a fixed and potent disposition to help others if the quickening, fostering influences of example, etc., are wanting.

Relative Importance of Internal and External Factors. It is impossible in the present state of our knowledge to say how much of the diversity of intelligence and of character that we find among men is referable merely to the superior force of this and that congenital tendency, how much to the selective action of surroundings, more particularly social surroundings, in fostering certain tendencies rather than others. The older psychology of Locke over-

looked the effects of the former. To Locke all men appeared to be born with equal abilities, the differences which subsequently disclose themselves being due to experience and education. Certain later thinkers, differing widely from Locke in their psychology, appear to have held the same view. Kant said "Education can make everything out of a man";[1] and Carlyle wrote of "the all but omnipotence of early culture and nurture". Herbart, more particularly, has emphasised the point that the process of normal development is not the result of a mere outward movement of the child's inner impulses or activities, which activities are predetermined from the first.[2]

The newer psychology rightly insists on the existence of congenital differences, on the effects of "nature" as distinguished from "nurture". Mr. Galton and others have certainly shown that similar conditions of life and training do not produce in the case of different children quite similar results. And this is just what our psychological theory leads us to expect. The force of the individual congenital impulse or disposition counts for something even in the case of "average children".

At the same time it is possible that, as a reaction from Locke's teaching, we of to-day are apt to underestimate the effect of surroundings and more particularly of early bringing up. These, though as we have seen, they are powerless unless they find something in the child with which they can come into vital *rapport*, nevertheless are important as determining which among the many latent tendencies of the child shall grow into fixed and definite aptitudes, interests, and lines of conduct.

To sum up, then, both factors must combine in every case of early development. Of this period, at any rate, it is manifestly true that mental progress is determined by the number of points at which environmental stimulus

[1] "Die Erziehung macht alles aus dem Menschen." Schopenhauer asserted the exact contrary: "Die Erziehung macht *nichts* aus dem Menschen".

[2] For a brief statement of Herbart's view of the relation of Education to Development, see Mr. and Mrs. Felkin's *Introduction to Herbart's Education*, pp. 11, 12.

can fertilise congenital tendency. Even later, when the child grows "independent" and educates himself, the process continues to involve in addition to pushful ambition a favourable environment of companions, books, etc.

Since every aptitude of a child which has begun to realise itself, and so to be observable to others, is a product of latent tendency and of impulse in co-operation, much of our talk about qualities being inborn or acquired is inexact and misleading. The qualities as soon as they begin to develop and to appear are the product of the interaction of the internal with the external factor. All that we can do then is to assume, within limits, a normal standard for both factors and to ascribe any peculiarities in the result to whichever factor differs the more markedly from the normal. In the case of the precocious musician or linguist, for example, the preponderant influence of the congenital element in the exceptional aptitude is apparent. Following this plan we may perhaps say that, given similar conditions of education, while the mental progress of average boys illustrates a balance of the two forces, that of more advanced boys is a case of preponderant congenital tendency, while such progress as is made by dull, backward boys is the result of a decidedly preponderant action of the stimulating element.

Bearing of Theory of Development on Education.

Relation of Development to Education. In saying that the full normal development of a child's mind, both on the side of intelligence and on that of feeling and character, requires the action of the social environment at its best, we virtually say that it requires education. No doubt a child born into an instructed and refined home will derive much benefit from his surroundings even when no methodical discipline of his powers is attempted. Yet such chance disconnected social influences would never secure a *complete* human development.

Following Nature. Assuming it to be allowed that methodical training is necessary, one may still ask what is its precise relation to the processes of "natural development". The influence of Rousseau and others is still recognisable in a good deal of the vaguer sort of writing about education. We are continually told to "follow nature," to make our teaching conform to nature's methods, and so forth. One suspects that there is a fallacy lurking in this way of speaking.

To begin with, then, education is, as we have seen, an art (*cf.* chap. i.). The early education of her child by an intelligent mother is far more than an instinctive process, such as we find in the "education" of its offspring by one of the lower animals. The methodical, carefully systematised scheme of education of the school is still further removed from such an instinctive mode of activity. It is essentially a human art—one of the most complicated and difficult of the arts, indeed—and as such consciously and intelligently aims at an end, and pursues this by well-defined methods. It is, moreover, an art which in a peculiar sense is the creation of the community, taxing all its resources of knowledge and the rest. Again, education does not, as seems sometimes to be maintained, follow the natural course of mental development. Since all development of a child's mind (which is worthy of the name) includes some amount of stimulation and guidance by others, the "natural course of development" can only mean the effect of such social influences as may chance to act upon it. This being so, one must maintain that the educator has not only to supplement such natural development but to interfere with it and to counteract its movements in this and in that direction. As an art education must rise above and control nature.

What is true in this talk about following nature is that a teacher must understand, and adapt his methods to, unalterable facts and laws. Thus he must study, as we saw above, the common characteristics of childhood, and he must know the permanent laws of mental growth.

and harmonise his course of procedure with these. In other words, although he aims at something very high above nature, he may be said to take his start from nature, seeing that he can only act upon a child's mind at all with real educative effect when he understands its proper modes of activity, and the natural order of unfolding of its powers, and adjusts the several parts of his method of training to these.

Methodical Training of the Mind. The systematic character of the teacher's mode of work is implied in the word "training". This involves the placing of the child in well-selected circumstances, and the bringing to bear on its mind and character of certain methodical agencies. To train any activity of the mind means first to exercise it in a careful and suitable manner; and, moreover, to follow out continuously a graduated series of such exercises.

Intelligent training, which adjusts itself to natural laws, will aim directly at calling forth activity by supplying the materials, and by arousing the needed moral forces, adapted to the stage of development reached at the time. Training may be said to be adapted when it supplies a sufficient and yet not excessive amount of stimulation. On this point views have changed considerably. In the old rigorous times it was held that the more difficult the task the more would be learnt. To-day our more indulgent attitude towards children inclines us to try to make their work pleasant. Science, too, comes to our aid, telling us that exercises which are well below the utmost capacity of the pupil are on the whole much more profitable than ones which approach or exceed the limits of his powers.[1] In this, educational theory is following what has long been athletic practice. One thing may safely be asserted here, that in good training the forms of exercise should be sufficiently varied to ensure manysidedness of development. Thus in training a boy's observation attention should be

[1] A. Allin, "The Origin and Function of Habits" in *Investigations of the Department of Psychology and Education, Univ. of Colorado.*

exercised in a variety of ways, *e.g.*, on colours as well as forms. Again, good training means exercising *all* the child's powers by exercises suitable to the stage of development reached. Training must be progressive, the tasks becoming more complex and difficult as the learner's ability improves.

Training as Determined by the Natural Order of Development. We see then that education must follow nature in the sense that there is a definite course of development through which the child must pass; and that, since the process is one of gradual unfolding, it is of no use trying to reach a higher stage at a jump. The later stages can be reached only by passing through the earlier: just as, when we put on a clock that has stopped, we must not do it with a rush, but must make a pause for the clock to strike at each hour. The only question is, how much delay there should be at each stage, and how far the child should be urged on with as little delay as may be. This in its turn connects with the question of how far the educator should constantly bear in mind his ultimate aim, that is, the production of the complete or perfect man; and how far he should rather aim, at each stage of development, at the fullest and best realisation of that particular stage. A number of somewhat revolutionary spirits have adopted the latter view and maintained that "school subjects" in the narrower sense are of minor importance, that the child has just as much right to live its life to the full ("sich ausleben") as the adult.[1] They adopt in fact the point of view of little Paul Dombey who to Dr. Blimber's "Shall we make a man of him?" replied "I had rather be a child". Indeed the general tendency of modern thought is to regard childhood not merely as a period of preparation for the glorious estate of manhood, but as having an intrinsic value and rights of its own. In any case, whatever may be our views on these questions

[1] This attitude is illustrated, for example, in M. MacMillan's *Education through the Imagination*. Prof. Stanley Hall applies the idea in a rather surprising manner to moral development. See his *Youth*, pp. 235 ff.

of value, it remains an unalterable fact that manhood can be reached only by passing through childhood, and that education must take account of the different stages of development and adapt its methods to these.[1] One of the really definite and valuable products of modern educational thought is that it is vain for the teacher to "rush" a child into the thicket of grammatical and other abstractions; that the training of the intelligence must begin with a methodical exercise of the child in observation through the senses; that the time devoted to this fundamental part of school work is more than saved by the gain in intellectual material thus stored up, which makes all the processes of ideation and thought more rapid, and their results more complete and valuable.

As we have seen, the process of intellectual development is one connected whole, and consequently the educative control of the earlier stages prepares for that of the later ones. At the same time the teacher must not suppose that by exercising the lower forms of intellectual activity he is doing the same thing as by exercising the child's mind in thinking about more abstract subjects, such as number and form. He should take care to move on, as the processes of development permit, to the training of the higher forms of mental activity. To know exactly when to begin the more difficult exercises of thought implies, as will be explained more fully by-and-by, careful child-study, both general and individual.

The Historical Culture Epochs Theory. We have seen above (p. 59) that there is a general correspondence between individual and race development not only on the organic but on the mental side. This truth has been used in a somewhat vague manner by Pestalozzi and Herbert Spencer as the basis of an educational rule: In education see that your teaching follows in its larger features the course of intellectual development of the race. The theory of the culture epochs goes further than this, asserting

[1] For one theory of how this should be done, see the next section.

that a similar correspondence may be traced in detail between the mental development of the child and the chief stages of *culture* through which the race has passed; from which assertion it deduces the practical conclusion that "the material of instruction should be drawn from the thought-material of that stage of historical development in culture which runs parallel with the present mental state of the pupil".[1] Accordingly, T. Ziller, the originator of the theory, drew up on this basis a syllabus for the eight years' course at an elementary school.[2]

This theory has not been generally accepted and is open to many objections. Thus it may be urged that the correspondence between the child at any period and the adult of some past age can never be complete. Again, even if the child tends, as a matter of fact, to pass through certain stages, it does not follow that education should develop each of these culture epochs fully; it may be better that some of them should be passed through as quickly as possible rather than emphasised. Once more, mere historical sequence is not an adequate criterion for determining which epochs of individual and race development correspond. Nevertheless, the theory is very suggestive and important as reminding us that there are such stages in race culture and individual development, and that there is a large measure of correspondence between the two. What stages should be more fully developed, and what literary and historical material should be used in so doing, must be determined largely on other grounds.[3]

No Isolated Development of a Process. Properly speaking, as we shall illustrate more fully later, a child's mind when at work is never carrying out one process in perfect isolation. As soon as he becomes intelligent at all, he will begin when observing a new object to carry out in closest connection with this observation simple processes of im-

[1] Quoted from Ziller by K. Lange, *Apperception*, p. 111.

[2] See J. W. Adamson, *The Practice of Instruction*, p. 110, or Rein's *Encyklop. Handbuch der Pädagogik*, art. "Lehrplan".

[3] For a fuller discussion of the theory, see K. Lange, *op. cit.*, pp. 110 ff.

agination and thought, *e.g.*, in wondering where it came from. What we call intelligence is at once observation, memory and thought—an organised group of processes which we call learning or mastering a subject. The educator who clearly seizes this truth will see that while in particular lessons he may emphasise the aim of training, now observation, now imagination, he must in every case appeal to the child's intelligence as a whole, encouraging him to remember and to compare while he observes, and to reason while he remembers or imagines. As Prof. Murray Butler tells us: "So long as college teachers know so little psychology as to cling to the old dogma of formal discipline, and continue to pound away on so much mathematics to train the reasoning process, and so much Greek grammar to train something else, regardless of the content of the instruction and of all other considerations—just so long will one mind be lost or injured for every one that is saved or benefited".[1] Since, moreover, as we have seen, to exercise a child's intellect implies an appeal to his feelings and an arousing of his will, we may say that *all good instruction involves some amount of training of the mind as a whole.*

Finally, mental training in order to be adequate must, while in all cases following a common typical plan, be to some extent elastic, adapting itself to the numerous well-marked differences among young minds. This aspect of the subject will, however, be more conveniently dealt with later when we consider more fully the difference among children in respect of mental capacity.

NOTES.

NOTE A (p. 59).—Prof. A. Marshall brings out clearly the practical value of theoretic knowledge: "The world's material wealth would quickly be replaced if it were destroyed but the ideas by which it was made were

[1] See *The Meaning of Education*, p. 84; *cf.* also above, p. 41, Note A, on Fatigue.

retained. If, however, the ideas were lost, but not the material wealth, then that would dwindle, and the world would go back to poverty" (*Principles of Economics*, p. 104, note).

NOTE B (p. 62).—About the "why" of variation we know nothing. About the "how" of it there are various theories. The Darwinian theory regarded it as taking place by infinitely small gradations; some recently prominent theories suppose it to advance rather by steps corresponding to definite elementary units of characters or even to whole groups of those. See the account of Mendelism and De Vries' Mutation theory in Prof. J. A. Thomson's *Heredity*, pp. 82 ff. On the relation of inheritance to variation, see the same work, p. 68.

NOTE C (p. 68).—These three terms have been used in different senses. Thus Prof. James says, "the cause of retention . . . is the law of habit in the nervous system." (*Psychology*, p. 289). Prof. Stout says that retentiveness is a condition of the formation of habit (*Manual*, p. 110). "Plasticity" is used for the genus of which retentiveness is a species by Miss Brackenbury, *Primer of Psychology*, p. 25. Very often the general quality has been called "retentiveness" while its species has been marked off as "retentiveness proper" or "retentiveness in the strict sense". It is convenient, however, to have two distinct terms.

PART II.

DEVELOPMENT OF INTELLECT.

CHAPTER V.

PSYCHICAL ELEMENTS: SENSATIONS, ETC.

We shall now proceed to trace more in detail the processes by which the several functional activities of the mind develop and give more and more complexity of form to the mental life. In doing this we must, it is evident, set out with the simplest known mental elements out of which the higher forms are elaborated. These are given to us at the outset, being secured by certain congenital arrangements of the nervous system. Such elements are the sensations of hunger, taste, smell, etc., which arise as soon as certain nervous processes occur. Having briefly reviewed these elements, we shall examine the way in which they are elaborated into the familiar forms of perceptions, ideas, and the rest.

In following out these processes of mental growth, we shall at first be occupied with those of intellectual development, since, as pointed out above, although they imply a concurrent development of feeling and conation, there are certain conveniences in studying them before the latter.

(A) Cognitive Elements: Sensations.

In order to understand how a child comes to know things, we must, then, examine the function of the senses; for all his knowledge of objects depends on the use of these.

Not that our cognitions are a mere compound of sensations and their residues, as has sometimes been asserted, but that sensation supplies the material which, when acted on by the functional activities of mind, becomes shapen into what we call a cognition.

This function of the senses in cognition is particularly manifest in early life: "Our first teachers of philosophy," says Rousseau, "are our feet, our hands, our eyes". They are necessary, however, for the later as well as for the earlier processes of intelligence. An examination of our most abstract notions about the physical world, such as "force" and "geometrical figure," leads us back to these impressions of sense. Our knowledge of this world is limited by our sensations; and the want of one of the higher senses, as in the case of those born blind, means the loss of a whole order of ideas.

Sense-Materials. The senses furnish us with certain mental materials, some of which are frequently called "sense-impressions," but which as a whole are best named Sensations. Thus the sense of hearing supplies us with sensations of sound. Sensations are assumed to be perfectly simple and primitive psychical processes. A bitter taste, a soft touch, cannot for our consciousness be resolved into simpler elements: we can only say that they are *given* to us. For this reason we cannot give a psychological definition of sensation, since there are no simpler mental states in terms of which to express it. We can only say that a sensation is a simple mental state which occurs upon the stimulation of the outer extremity of an "afferent" nerve, when this stimulation has been transmitted to the higher brain-centres or "psychical centres" (compare p. 27). Thus the stimulation of a point of the skin, *e.g.*, by pressing or rubbing, is said to be the exciting cause of a sensation of touch. Yet to a disembodied spirit—even to a highly cultured one with a turn for introspection—this definition would evidently convey nothing. That is, it has meaning only for one who knows *by experience* the kind of mental state resulting from such stimulation.

It must be clearly understood that we never experience a simple discrete sensation as just defined. For, in adult life, our sensory experience at once becomes transformed into percepts by various activities of the mind in a manner to be described in the following chapters. Hence it is only by an act of mental analysis or abstraction that we can isolate and examine the sensation itself. It is true that in the life of the infant there must be a time when these activities have not yet arisen, and in later life our experience at any moment includes a great deal of sensory material which is not attended to, or mentally "tooled"—*e.g.*, touches due to contact with our clothes, the sound of our own breathing, the sight of objects in the margin of the field of vision, etc.—together forming the "background" of consciousness. But in these instances of what we may regard as approximately pure sensory experience we cannot speak of separate sensations at all, but only of a simple whole of undiscriminated *sentience*. Accordingly it would be well to describe the function of a sense as the supplying of a certain variety of sentience or sense-material, rather than as yielding us well-defined sensations.

Besides the intellectual or knowledge-giving element, our sense-experience contains another, the affective element. This is best illustrated in such experience as a burn, or a cramp, in which the whole experience is largely a painful one. This element is often spoken of as a "tone" or aspect of a sensation, but, as we shall see later on when we come to consider feeling, is best considered as a distinct element though one closely conjoined and interwoven with the sensation.

In this way we may regard sensation, in the stricter sense of the term, as connected in a special manner with intellectual life, supplying this with its needed materials. A sensation, *e.g.*, of hearing, has certain definite features or characters, pitch, timbre, etc., by virtue of which it serves as a clue to what is going on in the external world. These features may be best spoken of as *presentative characters*.

The peculiar sensation, or complex of sensations, which we experience on hearing a particular note struck on a piano, or on touching a certain kind of book-cover, illustrates the prominence of such presentative characters.

Common and Special Sensibility. All parts of the organism which are supplied with sensory nerves, and whose functioning consequently gives rise to sensations, are said to possess Sensibility of some kind. But this property appears under one of two very unlike forms. The first of these is common to all sensitive parts of the organism, and involves no special structure at the outer extremity of the nerve. The second is confined to certain parts of the bodily surface, and implies special terminal structures or "end-organs," such as the curious nerve-terminations in the skin and in the retina of the eye. To the former is given the name Common Sensibility, and also Organic Sense; to the latter, Special Sensibility or Special Sense. The Special Sense-organs, those of sight, hearing, etc., as well as the different kinds of sensation connected with these, are regarded by the biologist as having been gradually differentiated, in the course of animal evolution, out of the primitive common or organic sensibility shared in by all sensitive parts of the body.[1]

The sensations falling under the head of Organic Sense are vague and ill-defined. They have a strongly marked and preponderant affective element. Such are the feelings of comfort and discomfort connected with variations in the processes of digestion, and in those of the circulation of the blood with the attendant thermal changes. These sense-experiences, moreover, are not, like sensations of touch and sight, directly connected with the action of external stimuli, but arise from a changed condition of the part of the organism concerned. As such they give us no knowledge of the external world. At best they inform us

[1] For an account of this process of organic and psychical differentiation or specialisation of the senses, see G. F. Stout, *Manual of Psychology*, bk. ii., chap. iii.

of the condition of the organism itself; but owing to the vagueness of their presentative characters the information they give, as every physician knows when he tries to get at his patient's pain, is vague.

The sensations of Special Sense are marked off in general from organic sensations, and more finely from one another, by definite presentative characters. This peculiarity is connected with the fact that each sense has its own specially modified structure or "end-organ"—*e.g.*, the nerve-appendages of the eye and of the ear—which, under normal conditions, reacts only to one particular kind of stimulus, *e.g.*, light-vibrations, air-waves. Owing to this definiteness of character the special sensations are much more susceptible of being discriminated and recognised than the organic sensations. Moreover, as resulting (in ordinary cases) from the action of stimuli or agents exterior to the organism, they constitute those "sense-impressions" which yield us knowledge of our environment.

Presentative Characters of Sensations. The two most important distinctions of presentative character which run through our several varieties of sensations are those of Intensity and of Quality.

The Intensity of a sensation refers to a difference of quantity. It is illustrated in the difference between the two impressions due to a bright and a faint light, to a loud and a soft sound, to a gentle and hard pressure on the skin. The varying intensities of sensations, by making known the loudness of a sound, the brightness of a light, and so on, are clearly clues which help us to know what is going on in the outside world.

As our way of speaking about it implies, the intensity of a sensation rises and falls with the strength of the stimulus. The precise manner in which change in the intensity of a stimulus affects the intensity of a sensation has been formulated in what is known as Weber's Law. The meaning of this law may be illustrated by a quotation from Prof. Ebbinghaus. "If (he writes) in a completely dark room the first burner of a gas pendant be lit, there results

a considerable illumination of the walls, furniture, etc., of the room. On lighting the second burner a further brightening takes place which although objectively exactly equal to the first, nevertheless subjectively makes a feebler impression. If finally twenty-five of such burners are already lit, the addition of a twenty-sixth will scarcely show itself in the luminosity of the walls, etc., though the living force of the æther-waves reflected from them has again increased by exactly as much as on the lighting of the first burner or on the addition of the second."[1] Again, if from a number of pieces of grey paper of various shades a series be chosen such that the difference between each consecutive pair appears to be equal, it will be found that the objective brightnesses of the bits of paper, or in other words the intensities of the stimuli, form a *geometrical* series. Further, any two stimuli, say two weights, must differ from each other by a certain amount to be distinguishable; this amount is called the *least discernible difference*. Suppose we can just distinguish one pound from one and one-tenth of a pound, then we shall not be able to distinguish between five and five and one-tenth pounds, but only between five and five and one-half; between ten and eleven pounds, and so on. That is to say, the least discernible difference corresponds, not to a constant amount of stimulus, but to *a constant fraction of the whole stimulus*. To sum up the results: in order that the intensity of a sensation may increase by apparently equal stages, or in such a way that each sensation is only just distinguishable from the next, the stimulus must increase by a constant fraction of itself. This is the generalisation known as *Weber's Law*.

This law, though it is found to have its limitations, is important in more ways than one. The chief practical application of Weber's law is to the comparing of one individual with another with reference to their discriminative sensibility. Thus if one child can distinguish weights

[1] *Grundzüge der Psychologie*, i., p. 496.

which differ by one-tenth, while another can only distinguish ones which differ by one-fifth, the first child's discriminative sensibility for that sense is double that of the second child. We can speak of a discriminative sensibility at all only because we can assume that results obtained, say, with weight of 9 oz. and 10 oz. will hold also with weights of 90 oz. and 100 oz. Otherwise the child who was superior with the one might be inferior with the other. (See below, Note A.) Other and somewhat looser applications of the law to the increase of pleasure will be touched on in Chapter XV.

A difference of *Quality* is illustrated in the difference between sensations of sour and sweet, of blue and red. All sensations have their differencing qualities: thus, tastes differ qualitatively from smells, and the taste of an orange from that of a lemon. These qualitative peculiarities are presentative characters, which serve as marks of the characters of external objects. Thus we distinguish flowers in part through qualitative differences in the colour-sensations involved.

Intensity and quality, though in general easily distinguished, are not wholly independent. A change of intensity is in certain cases attended with a change of quality. Thus, great intensity of light-stimulus tends to a blurring of the rich variety of colour-sensation corresponding to the prismatic series of tints, reducing this to a yellowish and a bluish tinge.[1]

The Special Senses. Coming now to the senses in detail we see that they are not equally equipped in respect either of the degree of definiteness of their presentative characters or of the number of these. We usually speak of Taste and Smell as the coarse or unrefined senses, whereas Hearing and Sight are described as the refined ones. A few words on the special function and intellectual rank of each must suffice; it being assumed that the reader already possesses an elementary knowledge of

[1] See Ebbinghaus, *Grundzüge*, p. 203, and Stout, *Manual*, pp. 155, 156.

physiology—of that part of it which deals with the structure and function of each of the sense-organs.

Taste and Smell. These two senses present a decidedly low degree of refinement. Indeed the sensations of these senses may be said to approach the organic sensations in want of definiteness, as also in the predominance of the element of feeling (pleasure and pain). Such peculiarities are connected with the fact that these senses have as their function the announcement of what is wholesome or unwholesome to the organism as a whole. The very situation of the organs at the entrance of the digestive and respiratory cavities suggests that they are sentinels to warn us as to what is good or ill. The two classes of sensation tend when occurring together, *e.g.*, in eating an aromatic substance, to be confused one with another, and neither of the two groups admits of such fine discriminations as are implied in colour and tone sensations. For this and other reasons they are of comparatively little importance as knowledge-giving senses. It is only under special circumstances, as those of the chemist, the wine-taster and so on, that these "servants of the body" supply a considerable quantity of exact knowledge about the properties of external objects.

Touch. The term "touch" has been used in a narrower and a wider sense. In the latter it includes all the sensations which are experienced when an object is "felt" with the hand. But these can be divided and subdivided as follows: (*a*) *Cutaneous Sensations* which again are subdivided into (1) *touch proper;* that is sensations of pressure—as illustrated in hard and soft, rough and smooth; (2) *sensations of temperature;* (*b*) *muscular* or *motor sensations* to be spoken of later.

Touch Proper. The sensations of touch are brought about through the action of some external object on the end-organs of the nerves of touch, which organs are situated in the skin.

Certain tactile sensations have a well-marked feeling accompaniment. Thus contact with smooth surfaces and

with soft bodies is, as we know, one chief source of sensuous pleasure, especially in early life. Yet in general our experiences of touch proper have but a weak affective element.

The chief importance of touch resides in its intellectual aspect. In its highest degree of development, as it presents itself at definite portions of the bodily surface, more particularly the hands, and pre-eminently the finger-tips, the tactile sensibility becomes a most important means of examining and ascertaining the properties of physical objects. The sensations of touch have a much higher degree of definiteness of presentative character than those of taste or of smell. The value to which they may attain in exceptional cases as intellectual material is strikingly illustrated in the history of Helen Keller.[1]

The discrimination of degrees of intensity by the tactile sense may be estimated by laying a weight on the supported hand, or some other part of the body and then trying how much must be taken away or added in order that a difference may be just perceived. This measures what is known as the Discriminative Sensibility to Pressure. It is found that this sensibility varies considerably in different regions of the bodily surface. For instance, on the anterior surface of the fingers the smallest difference of pressure recognisable is only about one-half of that recognised on their posterior surface. That is to say, we have about twice as much discriminative sensibility to pressure on the front surface as on the back surface of the fingers. The discrimination of degrees of pressure takes an important part in distinguishing weights, as also degrees of hardness.

In the case of touch we have to do with a new aspect of sensation which, as we shall see, is of very great importance. If a small coin is laid on the palm of the hand, and then a second, which, though having no more weight than the first, covers a larger area of the skin, we can, by means of the sense of touch alone, say that the second is the

[1] See *The Story of My Life*, by Helen Keller.

larger. This property of more or less "spread" in our sensation of touch has been called volume, or, better, *extensity*. It appears to have as its physiological ground the stimulation of a smaller or greater number of nerve-fibres.

Closely connected with this extensity of tactile sensation is another property. If a person is blindfolded, and then has his hand lightly touched, say, by the points of a pair of compasses, he will, provided that these do not come very near one another, be aware of two touches. This may be called the *local discrimination* of tactile sensations. Like the discrimination of pressure, it varies considerably at different parts of the bodily surface. It is much finer in the mobile parts of the body (fingers, tongue, lips, etc.) than in the comparatively fixed parts (the trunk). It decreases rapidly as we go from the extremities, as the finger-tips, towards the trunk. It is finer, too, on the anterior surface or palm side of the hands than on the posterior. We see from this that the anterior surfaces of the finger-tips are specially marked out as the organ of tactile sensibility. This fineness of sensibility is shared in by the tip of the tongue.[1]

These two presentative characters of tactile sensation, extensity and local distinctness, are of the greatest consequence for knowledge. It is by their means that we get to know about what is called "extension," *i.e.*, the shape or figure and the size of an object, also the distance between two objects which simultaneously touch us. Thus, in laying my hand on a small book-cover, I at once know something of its shape and size, and the distance of one angle from the other, because I am able to estimate the "spread" or extensity of the touch, also to distinguish the touch at one part of the hand from that at another. Further, local discrimination probably plays some part when we touch a rough surface, distinguishing the various projections and unevennesses. It should, however, be noted

[1] See W. James, *Psychology*, p. 62.

that we can feel a surface, such as sand-paper, to be rough even though the projections are too near together to be locally discriminated, especially if there is movement.

Sense of Temperature, or Thermal Sense. The organs of this sense, like those of touch, are situated in the skin and practically in every part of it. Thus contact with any object generally gives rise to sensations both of temperature and of touch—we say a thing "feels" coldj ust as it "feels" hard. Nevertheless, the reasons for regarding this as a distinct sense are conclusive. It is now known that this sensibility is connected with special nerve-structures distinct from those of the tactile sense proper, and does not vary in the same way as this varies at different portions of the bodily surface. If the point of a lead pencil is drawn slowly and with constant pressure along, say, the back of the wrist, little flashes of cold will be felt as it passes certain points, while between them the pencil is felt only as a hard point without temperature. These points are known as *cold spots*, and are scattered all over the body, though in greatly varying numbers in different areas. If the same experiment be made with a hot point —say a darning needle heated slightly in a spirit flame— similar *heat spots* may be found. They are not coincident with the cold spots.[1]

Passive and Active Touch. So far we have considered touch merely as a passive sense, *i.e.*, as sensibility to the action of things on the skin. But the fact that we speak of ourselves as touching things shows that it is an active sense as well. In touching an object it is we ourselves who bring the organ into contact with it, and so secure an exercise of the sense. Such active or self-initiated touch is effected by means of certain muscles, more particularly those by which the arm is moved, both as a whole and in its several parts. This bringing into play of the

[1] According to Dr. Head, sensations of temperature are still more varied; including warmth and coolness, as distinct from heat and cold. See *Brain*, No. 110.

voluntary muscles is a matter of very great importance as enlarging the range of our experience and knowledge.

The first and most obvious advantage of this addition of muscular activity is the multiplication, extension and control of our tactile experiences. Just as the mobility of the insect's antennæ enables it to gain many more impressions of touch than it would have if the organs were fixed, so the mobile arm, hand and fingers of the child greatly extend the range of his tactile experiences. By such movements he is able not only to bring one of the most sensitive parts of the organ (the tips of the fingers) into contact with a much larger number of objects, but to gain impressions of this and that object in rapid succession, and so to discriminate them better one from the other.

This widening and perfecting of passive sensation is, however, only one part of the gain resulting from the high degree of mobility of the hand. Another and no less important part is the new experience which arises from these movements themselves and which constitutes a distinct and very important source of knowledge. This experience is a new kind of sense-experience which is sometimes spoken of as "muscular sensations," though more commonly to-day as motor or kinæsthetic sensations.

Motor or Kinæsthetic Sensations. This expression marks off the sensations which arise immediately out of our (voluntary) muscular activity. They have to be distinguished from the *indirect* sensational results of this activity, such as the sensation of contact resulting on a movement of the arm towards an object. These sensations are now supposed by most psychologists to arise from certain changes in peripheral organs which are immediately connected with the activity of muscles and tendons. When, for example, the arm is flexed, the changes in the muscles concerned act as a stimulus on the sensory fibres, with which, as well as with motor fibres, the muscles are supplied. The effect of this, when the nervous process reaches the brain, is a sensation varying with the particular stage of contraction (or of relaxation). The movement involves, further,

a sliding of one surface of the joint over the other, and also stretchings and foldings of the skin on the outer and inner surfaces of the elbow, all of which "report themselves" in a similar manner by means of afferent nervous processes attended with sensations.

These motor sensations, like those of the special senses, have certain presentative characters of their own. They constitute *active* states in a peculiar sense, telling us of our own doings rather than of the effects of external objects upon us. In all vigorous muscular exertion, as in shouting, stretching out the arm to its extreme reach, or in pushing a heavy body, we have a clear consciousness of being active, and this differentiates these sense-experiences from such passive experiences as being touched, or hearing a sound. It is to be added that they differentiate the experience of active movement from that of "passive movement" which another person brings about when he stretches or bends one's arm. What is the precise difference of nervous process corresponding to this difference of psychical character between an active and a passive movement is as yet not quite certain (Note B).

The motor sensations are important both as a source of pleasure and as a means of knowledge. The young delight to exercise their muscles, to realise bodily power in movement. It is, however, as a source of knowledge that we have now to regard this sense.

The sensations which accompany muscular action may be conveniently divided into two main varieties. The first are (*a*) sensations of movement as illustrated in the experience of swinging an arm or a leg in empty space. The second are best described as (*b*) sensations of strain. They occur where the impulse to move a limb or the whole body encounters resistance and is obstructed. This experience involves certain cutaneous experiences of pressure; but in addition to these there is a distinct element of "muscular strain". This is illustrated in the experience of pushing against a heavy object, or of lifting a considerable weight with the hand.

(*a*) Sensations of movement present two well-marked differences of quality. (1) In the first place, they vary in character according to the direction of the movement. This applies not only to movements of different limbs, but to the stretching and flexing of the same limb, say the right arm: the sequence of sensations answering to the successive positions of the limb being different in the two cases.[1] These differences in the motor sensations enable us to know at the moment what kind, and what direction of movement we are executing. (2) In the second place, the sensations of movement vary with its velocity. The experience of bending the right arm quickly differs from that of bending it slowly. And we are able through these sensational differences to distinguish many degrees in the velocity of our movements.

(*b*) The sensations of strain, as when we push with the shoulder or arms against a heavy body, drag it after us, or lift it, have a distinct character of their own. They are experiences in which the consciousness of activity is most conspicuous; for we are most keenly aware of exertion or effort when it is impeded. They imply the prominence of certain of the ingredients of kinæsthetic sensation touched on above. According to the experiments of Goldscheider, sensations of strain in resisting an object have their physiological stimulus in the joints, whereas the sensations we experience in lifting a body have their stimulus in the tendons.[2] The several modes of strain-sensation exhibit, like those of movement, many differences of intensity. Thus we experience different sensations in pushing a perambulator and a bath chair, in lifting half a pound and a pound.

Each of these modes of muscular experience constitutes an important auxiliary source of knowledge in connection with touch. Indeed, our knowledge of bodies, including their size and shape, as well as their hardness, etc., de-

[1] On the distinction between position-sensations (when the limb is still) and movement-sensations, see Stout, *Manual*, p. 205.

[2] See E. Scripture, *The New Psychology*, pp. 265, 266.

pends in part on the experience which we obtain in muscular action.

In the first place, it is to the sensations of strain that we owe all our immediate knowledge of the most fundamental and characteristic property of material bodies, what is known as resistance, under its various modes, as hardness, density, rigidity. The sensation of pressure caused by laying a weight on the trunk of the body, or on the hand supported on, say, a table, would supply no distinct knowledge of this property. It is only when we muscularly react on material things, and find them resisting our efforts, that we come to know them as realities. Our common way of estimating the degree of hardness or density of a substance is by the aid of muscular discrimination. Further, the discrimination of weight, though (as we have seen) this is possible to a certain extent by way of passive touch, is much more accurate when the muscular sense is called in to help. If we want to estimate a weight nicely, for instance, that of a letter, when no scales are at hand, we lift the object and judge of the weight by means of the intensity of the kinæsthetic sensations involved.

In the second place, it is by help of our motor sensations that each of us acquires a knowledge of the extension of bodies, of the relative position of their several parts, of their shape and size. The rudimentary and vague knowledge we obtain of the form of a small object, say a cross when this is laid on the skin, from the local discrimination of touch needs, as we shall see, to be rendered distinct and exact by means of varied and repeated movements of the finger.

Sense of Rotation. Closely connected with our motor sensations are those which subserve bodily equilibrium. If we turn round rapidly for a few moments and then stop, we have a feeling of giddiness or vertigo; everything seems to be turning about us and we ourselves seem to be falling. Our efforts to prevent this apparent falling may bring about a real fall. These sensations are due to an organ forming part of the inner ear and known as the *semi-circular*

canals. Under normal conditions these sensations serve as signs of the incipient fallings to which we are constantly liable, and so enable us to maintain our equilibrium. The same organ probably supplies some of the sensations which we experience in being moved with acceleration (positive or negative) in a straight line; for instance when a train starts or stops, or when a lift begins to descend.

Hearing. The Sense of Hearing ranks high both as a source of pleasure and as a knowledge-giving sense. The sensations which form the material of music, those of pitch, together with their combinations, those of composite tones, or clangs, and the still more composite groups, those of chords, are among the most agreeable of our sense-experiences. The refined pleasures of music presuppose the discrimination of the pitch of the several tones. The intellectual value of hearing is due to the number and degree of definiteness of its distinguishable sensations.

The first thing to note is that hearing gives us an extensive *scale of intensity* of sensation. A trained ear can detect innumerable fine distinctions of loud and soft in musical sounds.

The intellectual character of hearing shows itself still more conspicuously in the qualitative differences among sensations of sound. To begin with, there is the broad contrast between musical and non-musical sounds or noises. The former depend on regularly recurring or periodic vibrations of the air, the latter on irregularly recurring or non-periodic vibrations. In the case of musical sensations we have the interesting feature of a continuous scale of quality. In passing gradually from a low note to a high one we experience a continuous variation of the sensation of pitch. The differences of pitch are known to answer to changes in the rate of vibration of the atmospheric medium; the higher the note the more rapid are the vibrations. The musical scale of Europe is made up of discrete tones, the smallest interval of pitch between which, namely, the semi-tone, is considerably larger than the smallest perceptible difference of pitch.

Along with this scale of pitch-quality, there are the differences known as timbre, or clang-tint, such as that between the tone of a flute and of a violin. These are known to depend on the different degrees of fulness with which the faint partial tones enter into and enrich the complex mass of a musical clang.

In addition to this wide range of musical sensation, the ear is capable of distinguishing a great variety of non-musical sounds or noises, as for example the roar of the sea, the rustling of leaves, the crack of a whip. We distinguish noises as jarring, grating, explosive, and so on. It is this side of hearing which is of especial value for the knowledge of external things. A child learns to recognise objects by the characteristic sounds which they produce, such as those of wood and stone when struck, of running water, of a trotting horse.

Finally, there are what are known as articulate sounds, those which constitute the elements of speech. These differ from one another partly in point of musical quality; thus the differences between the several vowel sounds are analogous to those of clang-tint between the tones of the several musical instruments. The differences of consonantal sounds are non-musical in character; in the ordinary classification of these into the gutturals, sibilants, and so forth, we find differences analogous to those among noises.

Enough has been said to illustrate the high degree of refinement which characterises the sense of hearing, and its value for knowledge and for feeling. Its characteristic defect is that it has very little local discrimination. We cannot distinguish two simultaneous sounds with any nicety according to the locality of their external source, as we can distinguish two touches. Nor is the organ of hearing in man endowed with mobility, as is the hand. Hence hearing gives us no direct knowledge of the important spatial properties of objects, size and shape.

Sight. The sense of Sight is by common consent allowed the first place in the scale of refinement. This

pre-eminence is suggested by the delicate and intricate structure of the organ, and the subtle nature of the stimulus (ether-vibrations). The eye surpasses all other sense-organs both in the range and in the delicacy of its impressions. These are at once the source of some of the purest and the most refined enjoyments, the pleasures of light, colour and visible form, and of some of the most valuable portions of our knowledge.

We note first that the eye is highly discriminative of intensity. It supplies us with a wide range of luminous impressions, from those of the brightest objects we can bear to look at to those of the darkest which we are just able to make out, and from white, through the series of grays, to black.[1] The fineness of this discrimination of intensity is of the greatest importance to us in the visual discernment of objects.

In sight, again, we have numerous and fine differences of quality. Of these the most important are colour-differences. The impressions of colour, like those of pitch, fall into a *continuum* or series of gradual changes. In passing from one extremity of the spectrum to the other we experience no sudden break, even though the change is more rapid in certain portions of the scale than in others. These changes fall into the series, violet, blue, green, yellow, orange and red, together with an indefinite number of intermediate shades. It is known that these differences of quality depend (as in the case of pitch-sensations) on changes in the rapidity of the vibrations of the stimulus, *viz.*, the rays of light. The rays at the violet end have more rapid vibrations than those at the red end. These colour impressions, while they supply an important element of æsthetic pleasure, are also of great intellectual importance. The child learns to know objects, such as his mother, his toys, flowers and so forth, partly by means of their colours.

In the case of sight, as in that of touch, we find two

[1] Black, white, and the various shades of gray are commonly spoken of as differences of quality.

further endowments which furnish the basis of a perception of space-relations, including the form and the magnitude of objects. In the first place our visual sensations have *extensity* and *local distinctness* (*cf.* above, p. 99). Thus a small area of sky looks different from a large area, quite independently of their relative brightness; we do not confuse a small patch of bright sky with a large patch of dull sky. Again, luminous points in different parts of the field of view do not merely increase the total sensation or fuse with one another but appear to us as distinct by virtue of our power of local discrimination. The importance of these two properties of visual sensations may be realised to some extent by comparing them with sensations of smell. The scent of two roses differs indeed from that of one, but only in intensity; we cannot smell that there are two, still less what are their relative positions and how far apart they are. The visual discrimination of points is very fine, as we can note in reading small print, or distinguishing objects under a microscope. It is finest in the central region of the retina known as the yellow spot, on which, as the area of perfect vision, we bring the optical image when we fix an object with the eye so as to see it clearly.

With this exquisite fineness of local discrimination there goes in the case of sight a very complex and delicate muscular apparatus, by which a wide range of fine movements can be carried out with precision and ease. Sight is thus, like touch, an active sense. One advantage of this high degree of mobility, as in the case of touch, is to enable us to bring the most discriminative part of the organ (the yellow spot) to bear on the object we wish to see clearly, as when we direct our glance to a particular star. Another important consequence—to be dealt with more fully later—is that by help of the ever-changing direction of our glance as an object now in this, now in that part of the field attracts it, the whole field comes to be slashed out by eye-movements, till every point in it has come to be definitely placed—as away yonder, reachable by so much movement in

such a direction. This stage once attained we are able to follow the outline of an object with the eye, and this assists, in early life, more particularly, in acquiring knowledge of form.

Another muscular endowment of the eye needs to be noted. When we fix the organ on an object at a particular distance, special muscular adjustments have to be carried out to enable us to see this object clearly. These include accommodation, by which convexity of the lens is modified so as to bring the optical image exactly upon the retina; and convergence, by which the "axes of vision" of the two eyes are made to converge on the object so as to secure single vision. As we shall see later, the motor sensations and other changes connected with these ocular movements aid us as signs of the distance of an object.[1]

(B) Affective Elements.

Among psychical elements we find, besides sensations regarded as intellectual material, the closely conjoined affective elements. In the prænatal stage of life probably, and for some time after birth, these elements are strongly marked and preponderate over the intellectual. The first stage of the individual's consciousness is largely vague organic sentience, in which, as we have seen, feeling is much more conspicuous than differentiated sensational quality, etc. But this is not all. After the organs of special sense and movement have come into play the experiences to which they give rise are for some time much more affective processes than intellectual. It is difficult for adults to realise how much of the agreeable and disagreeable comes with the early sense-experiences. When I look at the sheet of white paper on which I write the whiteness has become for me a mere sign of a fitness in some usable substance to which I pay no attention; yet when I was

[1] It is a question how far these motor adjustments give rise to (vague) sensations.

a child it probably had a distinctly pleasing aspect. Older people find it hard to attend to their sensations apart from their meanings and practical bearings, and so miss many of the joys of childhood, *e.g.*, of listening to flowing water, wind, certain voices; of touching soft yielding things like fine grass, or pussy's fur; of watching the dance of a flame. Then the life of sense had "the glory and the freshness of a dream". We thus see that there is a meaning in saying that in the order of development feeling attains a certain prominence before the intellectual processes become well marked.

In addition to these sense-feelings the primitive affective elements include certain tendencies embodied in congenital nervous arrangements which serve from the first to determine the forms of our emotional life. Thus anger, fear, tenderness, appear in all children and assume each its characteristic mode of behaviour, quite independently of experience. This instinctive basis of emotion will be fully illustrated in a later chapter.

(C) Conative Elements: Primitive Movements.

Just as there are certain predetermined elements of the intellectual and affective life, so there are certain simple conative tendencies which appear at an early date, and are known to be the result of congenital nervous arrangements. Every observer of an infant knows that in the first weeks it not only experiences sensations together with feelings of pleasure and pain, but reacts upon these sensations and feelings by way of movements carried out by means of the "voluntary" muscles which, unlike the movements of the heart, blood-vessels, etc., involve a psychical accompaniment, namely, motor sensations. Although wanting in a represented end, and to this extent non-voluntary, they are to be included among conative processes, partly because they seem to imply a rudimentary impulse to move, and partly because they supply the child with the first experience of his powers of movement and of the effects they produce.

Of these primitive movements the first group are known as *Impulsive* movements. They are illustrated by the random movements of the limbs during sleep or immediately after waking. They are probably due to nutritive changes in the motor centres favouring a discharge of nervous energy. They are illustrated in many "spontaneous" movements of children, though these often involve also a simple conative process, popularly distinguished as a love of movement.

The second group of these primitive motor processes are known as *Reflex Movements*. They are movements which are excited by the stimulation of a sensory nerve; the incoming sensory process passing over instantaneously by one of the nervous arcs of the lowest level into an outgoing motor process. Some of these, *e.g.*, the movements of circulation and digestion, are carried out without consciousness; others of a higher order in the scale of evolution have an accompaniment of sensation, and have been called sensation-reflexes. An example of these latter is coughing, for though an involuntary act—except of course when affected—the irritation which provokes it and the movement itself are both sensed. Another example is the action of closing the fingers around a small object, such as the nurse's finger, when this is placed on the palm of the hand, an action which can be called forth soon after birth. Other reflexes, such as blinking when an object is suddenly brought near the eyes, occur later. Reflex movements follow so rapidly upon sensory stimulation that the sensation corresponding to this stimulation is not fully developed. In starting at an unexpected sound we hardly hear the sound before we start.

The third group to be noticed here are known as *Instinctive Movements*. The word instinctive is applied to a movement of a certain complexity, which, while it bears some resemblance to a voluntary movement, is not acquired by the individual, but is the outcome of congenital arrangements. The instinctive actions of animals, such as the nest-building and incubation of birds, are familiar

examples. Instinctive movements differ from reflex, partly in their complexity, *i.e.*, the number of distinct muscular actions entering into them, and still more clearly in their conscious accompaniment. A bird, when the migratory instinct takes it, is the subject of sensations which have a strongly marked element of feeling, amounting indeed to a state of emotional excitement.[1] While subserving a biological purpose, such as self-preservation or conservation of the species, these movements are not prompted and guided by an idea of the result to be produced. The hen does not sit on her eggs because she has studied the question and knows this to be the best means of hatching them but because the nest of eggs is for her a "never-to-be-too-much sat-upon object" as Prof. James puts it (*Psychology*, p. 394). At the same time, in the higher animals and especially in man, repeated experiences do, no doubt, lead to some amount of awareness of what will be the result, without the reactions ceasing to be instinctive.

Man, with his greater powers of adaptation and learning by individual experience, is less fully supplied than the lower animals with instinctive movements. Nevertheless, the child possesses a certain number. Some of these are well-developed and more or less permanent, as sucking, while other and more numerous ones which are rudimentary are transient only, as the instinct to bite, to hide oneself. An instinctive movement may appear later, *e.g.*, the co-ordinated movements of walking, though the infant shows a congenital tendency to move the legs alternately when its feet are made to touch the nurse's lap (Note C).

Development of the Senses. The several elements here enumerated, though congenitally predetermined, do not all appear in perfect form at the beginning of life. This applies not only, as we have seen, to certain primitive movements, but also to the sensations obtained by stimulation of the sense-organs: in other words, the senses require

[1] The close organic connection between instinctive action and emotion is emphasised by W. McDougall in his *Social Psychology*, pp. 26 ff. and 46 ff.

a certain time for the development of their proper functions.

What is commonly spoken of as the development of the senses includes mental work in attending to sense-impressions and rendering them definite and distinct. The discrimination of weights and colours has been found to be twice as delicate in children of thirteen and upwards as in those of six or seven.[1] With this we are not now concerned, but only with the development of the sense-apparatus itself. This development is illustrated in the fact that children are born deaf, and may even remain so for a day or two, only gradually developing after this a complete normal sense of hearing.

While the sensory apparatus thus requires a certain time for its development, the motor organs require a longer period. This is particularly evident in the case of the organs of locomotion, which only reach the development needed for carrying out their functions about the end of the first year. Other movements, as those of the hand and arm in grasping, and of the head and eyes in following a moving object, and turning towards an object, require a term of tentative practice before they get carried out in the required way. This need of a term of apprenticeship for carrying out movements with precision is a chief cause of the slow development of the senses. Even a "quick ear" presupposes the acquisition of readiness in carrying out the proper movements of the head.

Progress in sense-capacity may be measured under each of two aspects. (*a*) In the first place the sense of sight or other sense may show a greater or less degree of *keenness* or *acuity*, as determined by the weakness of the stimulus which just suffices to produce a sensation. (*b*) In the second place a sense may exhibit more or less of *fineness*, *i.e.*, discriminative sensibility measured by the smallness of the difference between two stimuli which is just recognisable. Practice improves both aspects of sense-

[1] E. L. Thorndike, *Notes on Child Study*, pp. 51, 52.

capacity up to a certain point. As we shall see, however, children differ greatly in the amount both of keenness and fineness of their various sensibilities, and these differences set special limits to the improving effect of exercise in each case.

The Early Care of the Senses. Since the senses, together with the motor organs which are so closely connected with them, supply the nutritive material for the whole mental life of the child, the care for their efficiency in the first years of life is a matter of great educational importance. Moreover, as we have seen, the life of the senses is much more prominent in childhood than later. In the first stages, mental development is largely development of the senses, and during this time the child is correspondingly interested in the purely sensuous qualities of things. The importance of this in the education of young children will be dealt with later.

On the physical side, also, the closest attention should be given by the mother and the teacher to the senses, more particularly those of sight and hearing, which, owing to the special delicacy of their peripheral organs, are liable to be deranged by a variety of causes.

We should exclude from the surroundings anything likely to be deleterious to the child's sense-organs, *e.g.*, a bad mode of illumination or a defective print in books. A like care should be given to the organs of movement, overstrain of the muscles of the eye and the hand—more especially the small muscles of the fingers—being carefully avoided. Thus occupations requiring very fine muscular adjustments, such as threading fine beads, pricking small outlines on cards can easily be harmful for young children.

Not only should positive injury to the organs of sense and movement be thus guarded against: the teacher should carefully adjust all sense-work to the conditions of favourable and easy activity. Here the importance of magnitude and scale in showing visible objects, such as letters to be copied, geometrical figures and the like, becomes apparent. A child is apt to be called stupid because the object he is

asked to look at is presented in a way unfavourable to an easy visual inspection, or on a scale too small to allow of that more vivid sense of line which grows out of movement along it.

Abnormal Conditions of Sense Life. It is more especially the two higher senses, hearing and sight, that are liable to be abnormally weak or entirely wanting. Complete blindness or deafness cannot fail to be detected, but simple weakness is more likely to escape notice. Thus short-sightedness may often be the cause of apparent stupidity, and the same applies to weak hearing. A very common cause of the latter is inability to breathe properly through the nose, a condition that one investigator found to occur in 7·8 per cent. of the boys, and 10·6 per cent. of the girls he examined.[1] In the case of sight there is a kind of weakness much more difficult to detect than short-sightedness, namely, colour-blindness. Even the normal child's knowledge of colours is less than is sometimes supposed. Thus Lobsien found that of one hundred girls of eight years, none could name orange, violet or indigo; nineteen could not name yellow, and twenty could not name green.[2] But in true colour-blindness there is not even the possibility of learning to distinguish certain colours. Some investigators have found it to occur in 4 per cent. of school children; others, less often, though there seems to be agreement that it is commoner in boys than in girls.[3]

Perversion of the feeling-element in sense experience occurs fairly commonly in the case of taste. The child takes pleasure in eating things normally considered unpleasant or disgusting, such as ink, chalk, soap and even insects, slugs, etc.[4] Apart from their danger to health such habits must, in extreme cases, be regarded as distinctly pathological.

[1] Tracy-Stimpfl, *Psychologie der Kindheit*, p. 28. [2] *Ibid.*, p. 12.
[3] *Ibid.*, p. 14. An account of the varieties of colour-blindness is given by Prof. Stout, *Manual*, bk. ii., chap. iv., § 6 ff. "Note-deafness," of which Grant Allen describes a case (*Mind*, iii. (1878), pp. 157 ff.), seems a comparatively rare defect.
[4] Tracy-Stimpfl, p. 26.

NOTES.

NOTE A (p. 96).—*Interpretation of Weber's Law.* This law has sometimes been stated: in order that the sensation may increase in arithmetical progression the stimulus must increase in geometrical progression. Thus stated it appears to provide a means of calculating the intensity of the sensation in terms of that of the stimulus and so of *measuring* the intensity of sensation. It is now held that the law gives no measure of our sensations, but only of our power of discerning differences between sensations.

Finally it should be added that even in the form in which the law is stated in the text it has been found to be only approximately true, and only for sensations of medium intensity. Probably it will even be found not to be the closest possible approximation to the true law.[1]

NOTE B (p. 102).—According to older authorities, *e.g.*, A. Bain and W. Wundt, the physiological source of our active sensations is not wholly peripheral but in part at least central. They would connect the characteristic feature of these sensations as *active* experiences with the process of innervation, that is the initial central stage of the efferent process which excites the muscles to contraction. The much-debated question whether we should still retain the hypothesis of such innervation-sensations is considered with excellent impartiality by Stout, *Manual*, pp. 205 ff.

NOTE C (p. 112).—It is to be noted that we are here speaking of *instinctive movements*, not of *instincts* in the wider sense of the term. Man has relatively few stereotyped chains of movement-complexes, such as the instincts of ants or bees. But as Prof. James points out (*Psychology*, p. 406), he has many more instincts in the sense of innate tendencies to feel a specific kind of emotion in particular circumstances, impulses to strive for certain more or less general results, *e.g.*, the hunting instinct, the parental instinct. See also W. McDougall, *Social Psychology*, chap. ii.

[1] See for instance "On the Relation of Stimulus to Sensation in Visual Impressions" by Prof. Lloyd Morgan, *Psycholog. Review*, May, 1900. *Cf.* Ch. S. Myers, *Text-book of Experimental Psychology*, chap. xix., especially pp. 263, 264.

CHAPTER VI.

MENTAL ELABORATION: ATTENTION.

HAVING briefly surveyed the field of sensation which supplies the raw material on which our intellectual life sustains itself, we may proceed to consider the processes by which this material is worked up or elaborated into the later products, such as perceptions and ideas. As pointed out in chapter iv., this elaboration is essentially an organic process. We have to determine and illustrate the simplest processes by the co-operation of which the movement of intellectual development can be understood.

Attention as a Factor in Elaboration. As already remarked, in tracing the course of development of the human intelligence we may for the moment omit from view the practical reactions to which intellectual processes lead up. Yet one mode of reaction is so constant and important, and is so interwoven into the texture of intellectual processes, that it must be considered at the outset. This reaction is known as Attention.

As illustrating the *active* phase of mind, attention can only be adequately studied later on when we take up the subject of conation. Yet even at the present stage of our inquiry we may make a preliminary study of it. In touching on it here we shall be concerned with it mainly as a determining factor. The understanding of it as a mode of conation determined by feeling will only be possible after a study of these two aspects of mind.

The Focus of Consciousness. We have already seen that one's concrete experience at any moment is always psychologically complex. For you who read this book,

experience is for the moment primarily made up of the words of the page you are reading, together with the ideas which they call up. Along with this experience you have others: you feel vaguely the warmth of the fire, the movements of your own breathing; you hear the fire crackling, the voice of some one talking outside the door, etc. Suppose now that the voice, which was a moment before merely so much vague noise, more or less disturbing to your real occupation, suddenly pronounces your name. At once a curious change takes place; your eye, perhaps, still stares at the page, you still breathe, the fire still crackles, all the circumstances are the same, but your experience is transformed. Its elements indeed are the same, but their arrangement is different. Psychology, instead of forming the centre to which all the rest was a mere background, has now fled to its own place in the lumber-room of your mind, and the universe to you is a voice about to say things, good or bad, about yourself. Round this there is the same background as before, except that it includes the view of the white page with its meaningless black marks, at which your eye gazes unseeingly.

In psychological language, a movement of *attention* has taken place; you were at first attending to psychology, but afterwards you attended to the sound of your own name. In each case the part of your total experience to which you attended was clear and distinct while all the rest was faint and dim. This concentration of clear awareness upon one small area of all that is presented, at the expense of the rest, has been compared to the focussing of rays of light upon a single point by a lens. By a movement of attention we can, by carrying the mental glance over the field of sensations, ideas, etc., of the moment, make any point that was marginal and dim before, focal and clear (Note A).

General Function of Attention. Since attention is the process by which obscure contents of our consciousness take on clearness, it must, it is evident, play an important

part in the economy of our mental life. It serves to bring about an orderly arrangement and a simplification of its contents. At any moment of full wakeful life we are assailed by a multitude of sensational stimuli, some coming from without, others from the organism itself. Attention is the mind's selective attitude which helps to give a hearing to some one of the crowd of competing applicants. A most important result of this selection is that by successive movements of attention we are able to reduce the multiplicity and confusion which present themselves to *a single orderly thread of events* which we can afterwards more or less completely retrace.*

While, however, we thus at the outset assign so unique a place and so prominent a function to attention, it must be borne in mind that, it is not, in its more energetic degrees, a necessary factor in every psychical process. It is an extra output of mental activity, which is especially required for all new, unfamiliar modes of experience and activity. Thus a child has to attend closely when first learning to walk, though when the action is perfected by practice he need hardly attend at all to what he is doing. So with perceptions and ideas. We can recognise objects of daily use, as our hat, or our pen, by a rapid, barely conscious glance; but in recognising less familiar objects we have to attend closely. The result of this is that our attention is set free for new tasks. Thus the child that has learnt to run can turn its attention to learning to trundle a hoop at the same time; and when this has in its turn become automatic, the attention is again set free and the child can chatter to its companions as it goes. On the physiological side this means that the groups of arcs corresponding to the various sensation-movement-complexes become correlated so as to function as wholes without the constant guidance of clear consciousness.[1]

It follows that on the amount of attention which a child is ready to give will depend the rate of his advance in

[1] See W. McDougall, *Physiological Psychology*, pp. 59, 60, and 153 ff.

knowledge and in the use of his active powers. Attention is the supreme manifestation of psychical and cerebral energy, and according as it is well supplied or deficient the whole of a child's mental progress will be rapid or slow. No part of the mental mechanism is thus of greater practical interest to the teacher than the processes of attention. A rise or fall in the freshness of its vigour requires the teacher's careful observation, as a sign of fluctuating mental vigour; and in stimulating and directing mental activity he will be primarily concerned with the conditions of a lively and prolonged attention.

Definition of Attention. Attention is mental activity specially directed to something, say a sensation, which presents itself at the moment in the stream of consciousness. This directing of the mental glance is in general a conative process and implies a rudiment of striving. This striving is directed to the realisation of a full clear development of the sensation or other element which in the dimness of the marginal or subconscious region remains undefined and blurred. More particularly, attention, in connection with intellectual process, means activity which serves to bring out into sharp definition the presentative characters of sensations, perceptions and ideas, *e.g.*, the precise degree of brightness or shade of quality in a colour, or the difference in intensity or nuance of quality between one colour and another. Attention does not add to the intensity of our sensations though it does make their degree of intensity sharper. In other words, attention has for its characteristic effect the substitution of *clearness* in perception, ideation, etc., for *vagueness* (Note B).

Attention is rarely a momentary act. When the object has more than a moment's attraction for us we prolong the direction of attention to it. This prolongation, again, involves a continuously changing process. The increase in clearness due to the first reaction leads to a better adjusted act of attention. Further, any increase in the attractiveness of the stimulus disclosed by the first direction of attention will clearly tend, not only to prolong, but to intensify

the activity. We have here something analogous to what has been called an "organic circuit," a continuity of action in response to stimulus which involves progressive organisation, both of sensation and of motor response.[1]

Anything presenting itself to the mind and having attention thus directed to it is said to be the "object" of this attention. This use of the word "object" must be carefully distinguished from the common use, namely, external objects. It includes not only sensations and percepts but images and ideas, *e.g.*, the image of the sound of the dinner-bell which I am expecting to hear. In this preliminary account of attention we shall confine ourselves as far as possible to the earlier and "outward" direction of attention, *viz.*, attention to sense-presentations. The process of "inward" attention, or attention to ideas, will be dealt with more fully later on.

In its earliest and simplest form, attention is to be conceived as a kind of reaction upon a sensation, already partially excited by the proper peripheral process of stimulation. Thus when a bird flying past attracts our attention, it is the sensory stimulus supplied by the movement of the image of the bird over the retina that arouses the mental attitude, which in this case is accompanied by the movement of looking at the object.[2]

Attention is at once a process of reinforcing and of weakening. When my eye wanders over the features of a landscape, each movement of attention which illumines, so to speak, a new object, casts back the object fixed just before into dimness. As we all know, in trying to fix our thoughts on an idea we inhibit the tendency to attend to other things. Attention is thus essentially a *concentration* of consciousness which, as a narrowing down of the mental area, implies exclusion.

Attention as a mode of mental activity varies in intensity within wide limits. We popularly talk of attending only

[1] J. E. Miller, *Psychology of Thinking*, p. 51.

[2] As we shall presently see, "looking at," in the sense of directing the eyes towards, is not the same thing as attending.

where we make an appreciable effort, bringing "the will" into play. But the range of attention extends far beyond these occasional exertions. During waking hours, at least, there is always some amount of that mental activity which we call attending, though it may involve no conscious effort. It follows that what teachers often call inattention does not mean total absence of attention, but a withdrawal of attention. A child may no doubt be in a sleepy or stupid condition and not attending to anything in particular, but more frequently what we call children's inattention is mental energy diverted into what we consider wrong directions.

The characteristics of the true state of inattention or mental listlessness are relaxation of tension and the substitution, for a lively predominance of certain perceptions or ideas, of a dull level of vague sensations and thoughts. Yet as regards the particular presentation which is *not* attended to, the result is much the same, whether the attention is engaged elsewhere, or whether there is no attentive concentration at all. Thus the term "absent minded" and its French and German equivalents *distrait* and *zerstreut*, though seeming to imply total lack of mental activity are usually applied rather to cases where the attention is preoccupied or engaged elsewhere.

Bodily Accompaniments of Attention. The fact that attention is a mode of active consciousness suggests that it is accompanied by certain motor processes: and observation bears out this inference. Thus, to begin with a simple mode of attention, *viz.*, to perceptions, when we attend to an object in the field of vision we almost inevitably *look* at it, that is, we direct our eyes towards it and at the same time carry out a number of motor adjustments to produce the required degree of accommodation and convergence. Similarly in active touching; while, even in listening, attention seems to be accompanied by certain motor adjustments of the head, tension of the tympanum, etc. Such movements may accompany higher processes of attention, too, as when we screw our eyes up in order

to think of something, just as if we were peering into space for the thought. Further, it is found that in all attention there is "diffuse contraction of many voluntary muscles without reference to the nature of the stimulus," and that "the respiratory and circulatory processes are profoundly affected".[1]

Whilst attention is thus aided by certain definite movements, it requires the inhibition of obstructive movements. A severe effort of concentration tends to inhibit even movements like walking which are often helpful to the flow of ideas. A pedestrian when encountering a difficulty in thinking is very apt to "stop and think". Fidgety movements in children are a great bar to close attention, though they may, by momentarily relieving the strain, further attention in the early stages of its development.

Close as is the connection, however, between attention and muscular adjustment, the student must be warned against identifying the two. More especially there is a danger of this in the case of sight. As we have seen, when we want to see an object clearly we move the eye towards it so that its image may fall on the area of perfect vision (see above, p. 108). Hence our perception is made clear in some measure by the ocular movement, and independently of the concurrent fixation of attention. It is to be noted in this case that the area of clear vision and the area of attention need not coincide. It is quite possible, though difficult, to attend to an object on the margin of the field of vision and resist the tendency to turn the eyes towards it.

In addition to the motor or muscular factor, the physiological process in attention probably involves some change in the distribution of nervous energy in the brain, whereby those regions which are especially engaged are thrown into a state of greater activity. We may assume that when we look at an object intently the visual and other cerebral structures taking part function more energetically, while

[1] W. B. Pillsbury, *Attention*, p. 25.

the activity in other regions of the brain is inhibited or impeded.[1]

Area of Attention. All attention, as we have seen, is a narrowing of the conscious field, a process of concentration. But all processes of attention do not embrace equal areas or extents. In looking at a landscape we may fix the eye either on a small object, as a distant castle, or on a larger portion of the scene, as a chain of hills. Similarly we may attend to some particular localised sensation, say in the finger, or to the condition of the body as a whole.

As implied above, even when we single out for special attention some object in a group, the other objects may be indistinctly apprehended in the margin or background of consciousness. Thus in listening to a nightingale, there is, besides the notes which are the real object of attention, a mass of less distinct impressions forming a setting, and giving much of its character to the experience. Not for nothing does the poet say "*darkling* I listen". It is this ability, when attending to an impression, to glimpse its dim mental surroundings which enables us to discern its relations. We get into the way of looking at things not as isolated, but as emerging from a background, as belonging to a connected world of objects.

If now it is asked, to how many things can we attend at once, the answer must be, to one and only one. "One thing at a time" is a universal law of our mental activity. But if it is asked further what is "one thing" the answer is not so simple. We may attend to the Milky Way or to a grain of sand, to the roar of traffic in a London street or to the squeak of a mouse: a "thing" is in fact for this purpose anything that may be the object of a single act of attention, that is, anything that we can regard as a single, but not necessarily simple, whole. The complexity of such a whole, that is, the amount of objective material which can be embraced in an act of attention, is limited

[1] On the bodily accompaniments of attention, see Ribot, *La Psychologie de l'Attention*, chaps. i. and ii.; McDougall, *Physiological Psychology*, p. 154; Meumann, *Experimentelle Pädagogik*, i., pp. 84 ff. and 93 ff.

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only by the capacity of the subject, the nature of the material, and his familiarity with it. The child learning the piano at first reads a single note with difficulty; the trained musician will read off at a glance complex chords and sequences of these. Similarly the number of letters of the alphabet that can be attended to at once, depends upon the ease with which they can be combined into a whole. Several letters forming a familiar word are grasped by a single act of attention as easily and as quickly as an isolated letter. The same is true of the sounds of the spoken word, as we realise when we try to imitate the words of an unfamiliar foreign language. Any kind of spatial or temporal grouping will afford a great economy of effort in attending to a number of apparently independent things. We get to know the stars by seeing them as constellations. Of these methods of grouping some of the most important are those included under the general head of rhythm, as we shall see later. But any groups of presentations whatever may come to be apprehended as wholes if they recur frequently in the same grouping (Note C). For the teacher, one of the most obvious applications of the above facts is to the teaching of reading, in which, as we now recognise, a child must be trained in attending to wholes, and not, as used to be thought, to each letter. This point will be dealt with later.

Movement of Attention from Sign to Meaning. Attention To and Attention Through. We have seen that attention is set free from processes which at first require it, as they become familiar and mechanical. We have seen also that the number of objects or activities to which we can attend together depends upon the degree with which these can be mentally unified. In our first example of attention, a student reading a book on psychology, we said that the object of the attention was the printed words and the ideas they stand for. Now cases of this sort illustrate partly the principle that attention is set free from familiar processes; the activity of reading has become so familiar that it requires little attention. But partly such

cases illustrate the importance of mental unity: we can attend to the meaning of the words without interfering with the correct reading of them, largely because word and meaning have become for us part of an organic whole. In such cases the stress of attention seems to be laid on the meaning rather than on the sign. We attend apparently *through* the sign rather than to it.

The difference here will be seen at once if we compare the attitude of the student with that of a proof-reader. The former must indeed attend in some degree to the words; they are at least much nearer the focus of the attention than the ticking of the clock and so on; but the real object of attention is rather the meaning of the words. Thus he is very likely not to see a misprint, unless this interferes with the ideas, though a contradiction among the ideas themselves will be at once noticed. The proof-reader, on the other hand, has to acquire the art of attending to the words themselves, their spelling, spacing, etc., and to the meaning only in so far as it is necessary to make sure that the words make intelligible sentences. It may be added that by a considerable effort we may get beyond the proof-reader in discarding meaning by re-acquiring the lost art of the child who is beginning to read and attending to the appearance of the letters; in which case, as W. James reminds us, the words are apt to take on a weird, bizarre look, being reduced to their "sensationalnudity".[1]

This distinction between attention to a sense-presentation in itself and attention to the meaning of which it is a sign will be found to be of great importance, especially when we come to consider perception.

General Conditions of Attention. The amount of attention forthcoming at any time depends on two chief circumstances. The most general condition is the quantity of brain energy available at the time. This determines at once the easy flow of attention implied in ordinary

[1] *Psychology*, p. 314.

mental work and the amount of extra effort producible when this is required. It follows that attention is the first process to show the oncoming of central nervous fatigue (compare p. 32). A healthy child in the early part of the day has a superabundance of brain energy, which shows itself in a full flow of attention to all sorts of things, including comparatively uninteresting matters. Indeed his activity prompts him to seek out objects of attention in his surroundings. On the other hand, a tired or weakly child will need a powerful stimulus to rouse his mental activity at all; and will be quite unable to rise to the more energetic achievements.

Next to this supply of the needed cerebral and mental energy, we may include among general conditions of attention, the strength of the particular stimulus brought to bear at the time. With the same amount of disposable mental energy a boy will now be inattentive, now moderately attentive, and now keenly attentive according to the character of the objects which offer themselves to his attention. We have now to inquire into the forces which thus determine the special directions of attention.

The Determinants of Attention: (*a*) Objectively Determined; Reflex or Involuntary Attention. The nature of one act of attention is essentially the same as that of another, but for practical purposes it is useful to make a rough classification according to the conditions or causes which produce the attention.

However great our preoccupation or drowsiness, a sufficiently *intense* sensation will always attract the attention. A pistol fired close to the ear even of a philosopher, or of a just man asleep, is pretty certain to attract notice. Again a sudden *change* of any kind acts powerfully upon the attention. In a famous saying Hobbes tells us that change is necessary for all prolonged conscious activity: we cease to be consciously affected by a constant and uniform stimulus such as the pressure of our clothes. This "law of relativity," as it has been called, is closely connected with the conditions of attention. If we are

looking vacantly down upon a railway in the evening we may not notice the unchanging signal lights; but if one of them suddenly changes from red to green our eye is sure to be "caught" by it. In the same way, the miller does not hear the monotonous sound of his mill unless it stops—if the "bull" is allowed. Further, one particular kind of change is so important that it must be mentioned separately: this is *movement*. While in general we are quite unaware of the contact with our clothes, the tiniest beetle crawling over our skin is felt at once. A shooting star is always seen if it crosses our field of vision at all. If a window of a class-room looks on to a street, all heads turn towards it each time some one goes by. The boy who knows the answer to a question waves his hand wildly lest the teacher should overlook him.

Closely connected with this involuntary or compelled attention to intense sensations is the reaction to sensory stimuli which, even though of moderate intensity, have a markedly *pleasant* or *unpleasant* effect. Beginning with the latter, we all know how a pain, such as a bad toothache, will draw off the attention of the best pupil hardly less than that of the laziest. This is, indeed, the most striking example of an involuntary or compulsory movement of attention.

If, instead of an unpleasant, a pleasant sensation presents itself the effect is somewhat different. The agreeable stimulus will, to be sure, act as a diverting force just like a loud sound; only it seems to *lure* away the attention rather than to *force* it away. Thus a boy who tries to solace himself with a peppermint while he is doing a bit of awkward arithmetic will find himself the loser instead of the gainer, since his attention will be diverted from his work by the soft solicitations of the aromatic sweetness. The response in this case, though not the result of a fully developed volition, involves a rudimentary conative process, namely, the striving to realise and prolong an agreeable feeling.

(*b*) **Subjectively Determined: (1) Spontaneous Atten-**

tion: Assimilation and Interest. A presentation is much more readily focussed if there is already in the mind an idea or "mental trace" corresponding to it. Having once seen the face in a puzzle picture we see it instantly on looking again. If during a walk in London we meet a friend, and an hour or two later chance to encounter him a second time, then, owing to the circumstance that the first impression has set up a temporary assimilative or apperceptive attitude, his figure seems to start out from the crowd of unnoticed people. The recognition in this case is accompanied by an agreeable feeling of surprise.

New presentations which instantly connect themselves with what is familiar and has value for our feeling tend to attract the attention. A child will instantly listen when in the midst of a dull talk between mother and visitor his name is indiscreetly mentioned; and the literary man, who, as we all know, retains much of the simplicity of a child, will turn his eye to what looks like his name on the page opposite the one he is reading. What the Herbartians call involuntary apperceptive attention illustrates this effect of past experiences and ideas on present directions of attention.

This action of mental traces or ideational tendencies has another kind of effect on the attention. If what is now seen conflicts with these tendencies the attention is also attracted. In a familiar room the usual objects pass so unnoticed that we may be quite unable to give an approximately correct description of them from memory; yet if a new picture is hung up it strikes us at once on entering the room. A marked change in our surroundings, whether the removal of an old object or the introduction of a new one, is "noticeable," that is, attracts the attention. Novelty acts as a powerful attractor on the attention.

These two conditions of attention lead up to the consideration of *interest*. We may attend to an object only for a moment, and then attend to something else quite unconnected with it, or the object may keep the attention fixed upon itself and connected objects. The continued

activity involved in the more sustained attention can only be called forth through the agency of some feeling. This feeling, viewed as sustaining the attitude of attention, is called *interest*. It will be discussed more fully in the next section.

(*b*) (2) **Voluntary Attention.** Attention becomes a true conative process as soon as there is a striving to realise more fully or prolong an agreeable state, as in listening to a pleasant sound. Voluntary attention, however, as ordinarily understood, implies a clear idea of an end. To illustrate this let us suppose that a certain school-boy is doing arithmetic, an occupation for which he has only a tepid liking. In this case the interest of the subject is insufficient to start the attention, which has consequently to be fixed on it under the spur of a motive, that is, the desire to realise some end. He reflects, we will suppose, on the freedom which will follow the end of his work. Thereupon the doing of the sums appears to him in a new light as the necessary means to the attainment of a desired end, and he begins to add with great energy. In this way by some slight interest in the figures before him attention will be secured for a time. Nevertheless, before long another mental glance at the release to follow will be necessary in order to whip up flagging attention; and so the whole process repeats itself. Such attention, given to one object or process because it is seen to be the means to an explicitly realised desirable end, and preceded by a definite resolve to attend, is known as Voluntary Attention. It is not sustained attention but consists essentially of a momentary act of attention, though this act may be frequently repeated. Thus in our example, the thought of sums as means to freedom occurs at intervals, serving to start the necessary activities, but not supporting them all through. The function of the voluntary exertion is thus to lead to, and be replaced by, interested attention. Its use may be likened to that of shaking a watch and, if necessary, repeating now and again the jogging, till the works are fairly started and the "going" can take care of itself. It is to be observed that though this volitional process of

plodding is in the strict sense momentary, yet the term Voluntary Attention is commonly applied to the whole process of attention as started by volitional effort and carried on by interest. It is, indeed, this form of attention which is the most valuable and the one which the teacher is most concerned to secure.

From this interested attention aided by recurring spurts of voluntary attention we must distinguish a more completely voluntary or volitional process of continued attention. In this process any interest excited arises largely out of the conative attitude, and more particularly out of the end. Even in the interested attention as just illustrated there is often some end which we are more or less distinctly aware of throughout the mental activity. Thus the story-reader wants to know whether Ronald and Beatrice are going to be married. This attitude of keen pursuit gives an interest to each successive part of the activity as a stage bringing one nearer the realisation of the end. In this way end and means are bound together in an organic whole by their relation to a single interest—that of the final fruition. Even obstacles to conative progress, though for the moment unpleasant, will, if not too serious, add to the keenness of interest by exciting more energetic effort and securing the enjoyment of a triumph over difficulties.

It is to be noted, however, that when the end lies palpably outside the process of attention, as when a boy attends to his arithmetic in order to be free to play by and by, the spreading over of interest from end to means is restricted. It is indeed precisely in such cases, where attention has to be given to what is not intrinsically interesting, either from the attractiveness of the subject-matter or from the reflected attractiveness of an organically united end, that attention becomes most irksome and least productive.[1]

[1] The student may compare with the classification of the various kinds of attention here touched on the scheme given by Stout, *Groundwork of Psychology*, pp. 50 ff.

Relation of Interest to Attention. The precise psychological character of interest, and its relation to attention, have been much discussed of late, and a word or two more on the subject seems to be required.

To begin with, if interest is feeling, a question arises whether it is pleasant feeling, or includes also unpleasant feeling. In most cases it is certainly pleasant. If I am interested in a tune which I happen to hear played or sung in the street my interested attitude comes from the pleasantness of the sensations of tone and of their combinations. Again, since, as has been shown above, interest sustains the activity of attention it ought to be pleasurable, seeing that it is the production of pleasure which maintains activity. At the same time instances of painful interest are not hard to find. The child is intensely interested when watching a small surgical operation carried out on himself, or when the authorities are preparing punishment; the entombed miner is awfully absorbed in watching the rising water; the criminal (spite of superficial bravado) in listening to the passing of the death sentence. This effect, however, is probably a complex one. As tragic spectacles and more popular displays, such as the bull-fight, tell us, there is a special fascination in the terrible and the horrible, in which the painful element seems to minister to what as a whole is a pleasurable experience, made so in part no doubt by the very intensity of the attention called forth. All modern pursuit of excitement, of new thrilling sensations, illustrates the same tendency to find a satisfaction in a preternatural, almost ecstatic, completeness of absorption in things outside ourselves.

So far we have regarded the sustaining feeling as contributed by the objects of attention. But, as we have seen, attention is a conative process. Even interested attention is a prospective attitude, a pushing forward to what is coming. The child whose ear is caught by the sound of his name is all agog, speculating as to what nice things are going to be said of him. The reader of fiction can easily recognise this reaching forward of attention

which is always there so long as interest lures or pricks, though it is no doubt much more pronounced in certain exciting passages than in others. Now, as a conative process, attention develops its own characteristic satisfactions and dissatisfactions, and these feelings add a further element of interest.

We thus see that the feeling which enters into interest is complex. It may be regarded both as the condition and as the result of the conative activity in attention. That it is a condition has been sufficiently illustrated. As we shall see in a later chapter, feeling frequently arises in consciousness when the perceptions or ideas with which it is connected are dim and subconscious. To go back to our example: the name which, looking like our own, lures our eye from our reading, attracts the attention just because the dim "marginal" sight of the word has sufficed to stir the self-feeling so wondrously alert in us all. And feeling remains a condition throughout the whole process of attention. Thus when we are reading an interesting story the pleasure arising at each new unfolding of the plot incites attention for the next stage. At the same time the conative activity itself is producing pleasure, not only indirectly by carrying on the attention to new agreeable objects, but—when the conditions of a good story and of a reasonably clear style are satisfied—in a consciousness of full successful activity. Feeling and conative activity thus interact in all interested attention (Note D).

Classification of Interests. The term interest, like so many others that psychology has adopted from everyday language, is commonly applied with reference to practical and not to psychological distinctions. Thus it denotes (1) the subjective feeling of interested attention; (2) the intellectual recognition that a topic, object, etc., fulfils one of the conditions of interested attention; (3) these conditions themselves. When used in the plural, it must be understood in the third sense. Our "interests" answer to certain directions of activity in which we take pleasure as well as to certain groups of ideas and apperceptive tend-

encies which impel us to assimilate all new information bearing on them.

A man's *interests*, that is, the things, topics, actions, etc., which arouse in him the feeling of interest, spring out of and reflect his inmost nature. Thus to know a man's interests would be to know almost all about him; while, conversely, we can only say what his interests will be if we have a thorough knowledge of his individual nature. But men as a whole have some broad interests in common by virtue of their common human nature, and these are not the same as the interests of children as a whole. Each period of life has its own preponderant interests. It is here that the Culture Epochs Theory is particularly suggestive. Thus, just as fighting was once the chief business of mankind, so there is a period when boys are more interested in it than in anything else. The determination of the interests characteristic of the different stages belongs, however, to the study of concrete mind, and more will be said of it in the final chapter of this work. Here it must suffice to give a rough classification of interests from a more formal point of view.

(1) **Personal or Practical Interests.** These include (*a*) the interests which grow out of the organic instincts and appetites, and other practical needs. Thus the infant attends when it sees its mother preparing to feed it. In experiments upon animals' intelligence it has been found that the only way to attract their attention is to let some piece of food play a prominent part in the experiment. Here also belong the interests which depend upon the relation of the presentation of the moment to one's past experiences and personal concerns. When for example a child listens to the sound of the water poured into his bath his interest is due to the fact that the new impression has acquired a meaning for his intelligence and a value for his feeling through its kinship with his past pleasurable (or painful) experiences.

(*b*) Another class of interests grows out of practical activity. We have seen that the first stages in mental

development consist largely in the learning of movements; accordingly early interests are correspondingly concerned with movement. Learning to walk, trying to put on a shoe, manipulating things in all kinds of ways, climbing on to things and jumping off them, etc., are all absorbing occupations. All the chief directions of activity, such as exploring, collecting birds' eggs, etc., constitute special interests. The interest in play, to which there is attached a strong feeling, falls under this head.

(*c*) Most interests imply an element of feeling, in the shape of a liking for, or attachment to, certain regions of activity. In certain cases emotional experiences may be said to give rise to interests. We may instance *fear*, which plays such a large part in the lives of many children, and makes going to bed such a terribly exciting experience. Later, more complex emotional forms, such as the self-feeling, become sustainers of interest. Thus the child listens closely when some one is speaking about him; he begins to be interested in such experiences as putting on new clothes, having his photograph taken. The growth of affection for parents, brothers and sisters, and school-fellows, gives rise to new interests in their doings.

(2) **Æsthetic Interests.** In its simplest form æsthetic interest shows itself when the appearance of the object is itself such as to give immediate pleasure to the child in the very act of attending to it. Thus an infant will keep its eyes fixed for a time on the lamp brought into the room because of the agreeableness of the impression. Later, this leads, as we shall see by and by, to attention to a thing because it is explicitly classed as pretty or beautiful.

(3) **Intellectual Interests.** The interest in new ideas, facts and truths, is the type with which the teacher is more particularly concerned. Such interest arises most naturally out of a feeling of wonder at what is new, especially if strange and mysterious, as when a child sees a strange visitor with some mysterious appendage, as an eye-glass. Intellectual interests illustrate in a peculiarly clear

manner the connection between interest and apperception. In order to be interested in anything as knowledge we must apperceive it, that is, relate it to what we know already. This point will be dealt with below.[1]

How we Ascertain Children's Interests. It should be noted that many actual interests combine several of those treated as distinct in the above classification. Thus intellectual interest is greatly supported at first by personal and æsthetic interests. It would indeed be difficult to assign any interest to a particular class were it not that in each case of interest there is a more or less definite end or point of view which determines its form. Where this point of view cannot be ascertained, mere knowledge of the external object of attention tells us little. It is this which makes it so difficult to discover what are children's interests. A study has been made[2] of what children will collect, and the list includes all sorts of things from acorns to cigar-tags. The maxima were, for the boys, cigar-tags, stamps and birds' eggs; for the girls, stamps, shells and picture-cards. Yet we cannot conclude from this that, *e.g.*, boys' interests centre in cigar-tags, but simply that boys are interested in them regarded as things to make a collection of, although from any other point of view they may be quite uninteresting. Again, "suppose that someone should read us a story, say 'Little Red Riding Hood,' and you drew a wolf, whilst I drew a cottage and some one else drew the little girl, would that show that you were interested in zoology, I in architecture, and the third person in child-study?"[3] The choice of an object to draw, in so far as it indicates the direction of interest at all, shows only which object is most interesting from the point of view of something to be drawn.

Familiarity and Novelty in Interest. A thing which is wholly strange and consequently unsuggestive to a child

[1] Both the æsthetic and the intellectual interests will be considered more fully in chapter xvii.

[2] E. L. Thorndike, *Notes on Child Study*, p. 71.

[3] Thorndike, *op. cit.*, p. 67.

will never engage and occupy his mind, just because there is in his mind nothing by means of which he can apperceive it. In walking down a street, for example, a child will, as a rule, only notice those things which in some way remind him of, connect themselves with, and so are understood in relation to, what he already knows and likes—*e.g.*, the harness in a saddler's shop if he is fond of horses. Miss Edgeworth tells us of the want of interest in the wholly unfamiliar and too strange London sights which was manifested by some Esquimaux who visited our capital (*Practical Education*, ii., p. 118). In this case the mind has no niche for the presentation. On the other hand, quite familiar objects fail to arouse the sustained attention which is implied in interest, since the presentation at once, so to say, slips into a niche waiting ready for it and exactly fitting it, and there is an end. If, however, the presentation is partly familiar, partly novel, it finds a niche, but one which it does not exactly fit. Consequently there is set up a process of interaction between the presentation and the previously existing ideas, which perhaps causes the presentation to reveal itself in a new light, and at the same time leads to a readjustment and regrouping of ideas, in the way which the Herbartians describe in their doctrine of apperception. A simple illustration of this would be the attempt of a child, who has so far only seen men with a beard, to classify a beardless man. He may do so as "lady" or as "little boy" or as "man"; but in any case there will be a readjustment of his previous view of the class selected.

Expectant Attention. All attention as a conative process is prospective, directed to what is coming. In certain cases, however, there is a distinct stage of self-adjustment to coming "objects," as when a dog is waiting for the words "paid for" before snapping the morsel balanced on his nose, or a boy is awaiting the command "March!" or the opening words of a lesson. We may distinguish this more marked kind of pre-adjustment as *expectant attention*.

This pre-adjustment may assume the form of preparing for a definitely known presentation. If, for example, a drill-master says beforehand to his class, "When I say 'March!' begin to march at once," the children's minds are on tiptoe, so to speak; the brain-centres are active, carrying out in a measure beforehand the required adjustive processes, so that when the order actually occurs it is obeyed more quickly than if there had been no such warning and preparation. Experiments have shown that as a result of such preadjustment motor responses to a signal, *e.g.*, pressing on the button of an electric key as soon as a sound given as a signal is heard, are quickened; that is to say, that what is known as the *reaction-time* is diminished.

From this definite kind of expectant attention we must distinguish the indefinite kind, as when a child wonders what there is going to be on the dinner-table, or what the teacher is going to talk about. In this case the preparation, though not involving a definite idea, includes a certain amount of preliminary restriction of the attention, as well as the focussing of eye or ear for what is coming.

A measure of this same preliminary adjustment enters into all sustained attention, as when a child's attention follows the gambols of a dog, or the fortunes of the hero of his story-book.

Limited Function of Volition in Attention. A word or two may suffice to indicate the *rôle* of the will in attention, and the changes this *rôle* undergoes as mental development progresses.

(1) It is obvious that after volition appears on the scene the forces of non-voluntary attention continue to be active as tendencies. And the range of the will's action is in every case limited by these. Thus the most studious of children finds that there is some force of stimulus, as a disturbing noise, or an exciting spectacle, against which his will is impotent.

(2) Again, although we are able to direct the attention

at will, we have no power to keep the attention persistently fixed on things to which we are indifferent, which do not appeal to us. The will may be said to introduce mind and object; it cannot force an attachment between them. To secure this attachment interest must be developed.

As was suggested above, after a certain effort of initial concentration, attention, provided interest is aroused, may take care of itself. The objects observed or the ideas considered tend in this case to hold and dominate the attention. In this way voluntary attention is ever giving way to a form more akin to reflex attention.

Much of the educational importance of this initial effort in a prolonged process of attention is due to the circumstance that in many cases a lively interest is only developed after the mind and the subject-matter have remained in contact for some time. Many subjects of study, like many personalities, only disclose their attractions after a prolonged acquaintance. Thus the pleasure derivable from a beautiful poem or from an arithmetical problem only comes to the child who is ready to give his mind at first without the bait of pleasure. The "finding one's way" in a new branch of study illustrates this gradual substitution of an agreeable activity for what at the outset was to some extent a disagreeable one.

Rhythm in Attention. The importance of rhythm for attention is twofold. (1) Rhythm in the material presented facilitates attention; and (2) it is probable that attention itself as a display of psychic energy tends to be rhythmic.

(1) We have seen that the grasp or span of attention depends upon the ease with which a number of things can be grouped together into a single complex. Where the presentations are successive, rhythm provides a form of grouping. Thus by means of regularly occurring stresses disconnected syllables may be grouped into bars or feet, the foot thereupon becoming the unit for attention, and the total number of psychical unities being greatly

reduced.[1] In verse the grouping is carried still further, feet being grouped into lines, and lines into verses, etc. Further, such rhythm helps the attention by leading to expectant attention or pre-adjustment to what is coming.[2] This pre-adjustment makes possible a great economy of nervous energy where reactions are required to successive presentations, since if the intervals are irregular the energy put forth will be at one time too great, at another too small, which involves waste and leads quickly to fatigue.[3]

(2) If one attends to a very faint stimulus, such as the ticking of a watch held at such a distance as to be only just audible, the sensation disappears and reappears at fairly regular intervals. "The period of the fluctuation varies from 3 to 25 seconds with different persons and under different conditions, but is very much the same for the same person under one set of conditions."[4] A like rhythmic alternation occurs when "two nearly equal stimuli of different qualities which will not combine are applied at the same time to the same sense-organ".[5] Again, it has been observed that where a person is required to say each time he can observe a change in a stimulus which is constantly changing very gradually (*e.g.*, a note whose pitch gradually rises or falls), there is in many cases a tendency to give the judgments at the points of culmination of regular psychic periods.[6] Such facts have been taken to establish a general tendency to rhythmic rise and fall in attention. But the point cannot be said to be as yet clearly established, since some at least of the rhythmic changes seem to be explicable by processes in the peripheral sense-organs.[7]

[1] P. Barth, *Elemente der Erziehungs- und Unterrichtslehre*, p. 192.
[2] Barth, *loc. cit.*
[3] A. Allin, "The Origin and Function of Habits" in *Certain Aspects of Educational Progress*, published by the Departments of Psychology and Education of the Univ. of Colorado.
[4] Pillsbury, *op. cit.*, p. 70. [5] *Ibid.*, p. 71.
[6] L. W. Stern, *Ueber Psychologie der Individuellen Differenzen*, p. 98.
[7] On these rhythmic changes in attention, see Ward, art. "Psychology," *Encyclop. Britann.*, "Supplement," p. 62; Pillsbury, *op. cit.*, pp. 75 ff.; Titchener, *Lectures on the Psychology of Feeling and Attention*, pp. 263 ff.

Early Development of Attention.

First Stages. As has been observed, the early form of attention is the non-voluntary, including both the reflex and the interested attention as described above. An infant first manifests a rudimentary attention by a cessation of movements of the limbs, a wide opening of the eyes, etc., when some bright object, say a lamp or the mother's face, comes into its field of view. Changes in objects, especially movements, are the stimuli which excite this early form of attention. It appears, too, to assume greater energy during a state of intense feeling, as in sucking, or in watching a bright pretty object, as the play of light. Its progress is seen in a gradual inclusion, among its objects, of less powerful stimuli, less bright objects, weaker sounds, etc. With this change there develops a tendency to attend to things before indifferent, either because they happen to lie near objects attended to, or because they acquire an interest from a connection with what has engaged the attention. Thus the attentive glance moves from the red flame of the fire to the fire-irons reflecting the light. After having been interested in the look of the prepared food the child is very likely to become interested in the signs of its preparation. As the recurrence of experiences begins to render his surroundings familiar, we note the development of a special attention to what is new and strange, such as a new dress on the mother, a strange face. Very early too, certainly within the first year, we may note the influence on attention of the rudimentary formation of groups of ideas and permanent sources of interest, as, for example, pussy, mother, favourite toys or pictures, leading to apperceptive attention to things which concern these. Such groups of ideas increase in number and become more far-reaching in their influence as mental development advances. On another side, attention shows a tendency to assume a more general direction, *e.g.*, to the production of any kind of sound, to flowers, to horses and what not.

Growing Control of Attention. While attention to what is actually presented to the senses is thus following out new directions, we may observe the gradual expansion of the conative aspect of attention, that is to say, the conscious direction of it to the realisation of an end. This, as we shall see later, involves rudimentary processes of ideation. The first step in this direction is seen in the early forms of expectant attention, as in continuing to gaze at an agreeable object, or in following a moving object with the eye, or better still, in looking for an object, such as a toy which has fallen on the floor. Within the first three or four months the child may be said to begin an exploration of his surroundings, on the look-out for any object to inspect or examine.[1]

Exercise and habit play a large part in the early development of attention. What is first done with labour and sense of difficulty is, with repetition and practice, done more and more easily. This is due in part to the acquirement of greater ease and precision in carrying out movements of the eye and head which aid us in fixing and so attending to objects. Development of attention includes further the ability at once to attend to minuter details and to embrace a larger number of things, *e.g.*, a row of toy bricks, as one whole. The growth in power of attention is perhaps best seen in the direction of it to unimpressive objects, in a readiness to react on very weak stimuli. The increasing energy of attention impels to a larger and more varied direction of observation.

Concentration of Mind. Another aspect under which the growth of the powers of attention may be viewed is the ability to detain objects before the mind and to carry out a prolonged process of concentration on a subject. According to Messmer such persistent attention only appears when a child reaches the age of eleven or twelve years.[2] As we have seen, the first form of attention, which is hardly

[1] For an account of the early development of attention in the child the student is referred to Preyer's *The Mind of the Child* (part i., chaps. i. and ii.).
[2] Quoted by Meumann, *Exper. Pädagogik*, i., p. 90.

more than reflex, is a flitting from point to point, as new solicitations present themselves. A more persistent and sustained attention begins to show itself under the spell of interest, as when a child watches an animal feeding or listens to a thrilling story. It is, however, only as attention comes under the control of the will, and as the will grows strong, that it takes on that dogged determined look which is what we mean by concentration of mind. The peculiar value of all methodical instruction, whether in the home or in the school, is that it demands a prolonged fixation on a restricted field of objects, which, though largely sustained by growing interest in the subject, is throughout reinforced by the firm determination at the back of the child's mind.

This steady keeping of the attention directed to a subject clearly implies the power and the disposition to resist the solicitations of extraneous and distracting objects. Concentration of mind means that we mentally hold on to a particular subject, excluding all disconnected and irrelevant subjects. A child that is bent on examining some new thing, say a watch or picture book, tends, as he grows absorbed, to become less and less responsive to other and distracting things. This, as remarked above, is not the result of a voluntary effort so much as of the mastery of his mind by what at the time interests him. The beginnings of internal attention, *i.e.*, attention to ideas as distinguished from sense-presentations, imply much more of this effort. Yet even in this case a child grows absorbed, as we may see by watching one when reading amid the noisy chatter of grown-ups. The susceptibility to distraction has been found by experiments (to be referred to again later) to vary considerably among children. In general it diminishes with age and practice in attending.

It must be observed that when we speak of concentration of mind we do not mean that it involves no movement of attention. Here, as always, the attention is constantly moving, but within the limits of the subject—of what is relevant. In many cases, as where a child looks

out of the window during a lesson, it is easy to mark off broadly the relevant from the irrelevant, but in other cases this cannot be done. A teacher often finds that a child's answer or remark which appears at first sight to have no connection with the question, is in reality by no means irrelevant, at least from the child's point of view. Further, within the sphere of what is relevant, mobility of the attention, that is, the quality of being easily caught by new facts and aspects of the subject, is not a fault, but a most valuable property. To the pedant a falling apple would certainly have seemed irrelevant to a lesson on the moon; but, according to the story, it did not seem irrelevant to Newton, just because he was not a pedant but a genius, for it is one of the characteristics of genius to see relevance where others cannot see it. Thus the ideal type of attention would combine a maximum of attractability (by the relevant) with a maximum of resistance (to the irrelevant).[1]

Habits of Attention. The growth of voluntary attention involves the gradual formation of certain habits of attention, *i.e.*, fixed dispositions to give attention. Such a habit first appears as a recurring readiness to attend in a particular set of circumstances, as when the child is addressed by somebody, or, when the teacher enters the classroom and begins the lesson. This formation of habits of attention is largely due to the fact that, as we have seen, attention is accompanied by numerous forms of accommodation of the various sense-organs and by widespread muscular contractions of various kinds. All this muscular activity falls naturally under the laws of habit to be explained more fully later on. Thus the children form the habit of sitting up and looking at the teacher at the beginning of the lesson, and though this is not the same thing as attending it greatly helps attention, both directly (as in the accommodation of sense-organs) and indirectly

[1] See Stern, *op. cit.*, pp. 77 ff., where different "types" of attention are distinguished according as one or other of these qualities preponderates; also Meumann, *Vorlesungen*, i., pp. 83 f., 505 and 506.

by inhibiting other presentations. The term "attention" as used by the drill-master evidently refers to a complex bodily attitude to be taken up by the boys.

Educational Control of Attention. There is no branch of instruction which is not concerned with the exercise of the attention. We *must* exercise it if we want to teach anything. This exercise means in every case to arouse interest and curiosity, as well as some effort of will, as conditions of a due carrying out of the processes of acquiring, reproducing and applying knowledge.

In this side of intellectual training, we must, it is plain, in the first place, satisfy the conditions of adequate effective attention. Of the importance of avoiding the bugbear of monotony and of introducing freshness and variety in mode of treatment, it is perhaps no longer necessary to say much to the teacher. What is more important to-day is to emphasise the need of avoiding too frequent and flighty movements of attention from one subject to another, of training the young mind in a sufficiently long and sustained mental effort. Hardly less important is the caution against springing a perfectly new idea or new verbal expression on an unprepared mind, since, as we have seen, attention moves only within the realm of objects which are at once in a measure new and yet are partially familiarised by some relation to what is already known.

In the second place, we do well to bear in mind that, since a child's power of voluntary attention is rudimentary, all unnecessary difficulties should be removed, and the task of learning made attractive and agreeable. Inasmuch as a child's attention is apt to be drawn outwards to the sights and sounds of the external world, and is less easily diverted by the teacher's words towards the invisible world of imagination and thought, everything should be done to reduce the force of distracting outward things. Do not even older students, indeed, require for the closest and most effective attention a measure of quiet and retirement from the exciting provocations of the senses?

But, again, the subject and the mode of treatment chosen by the teacher should be such as to awaken a child's interest. This important principle holds good throughout the processes of education, for, as we have seen, all effective and fruit-bearing attention is inspired and sustained by interest. It bears more especially on the early stages of instruction before children have acquired the habits of the scholar, and find it hard to give a continuous and patient attention. The teacher of young children has before all things to make his subject-matter interesting, to open up its attractive and impressive features, to invest it with pleasing suggestions, to illustrate it by ample reference to what the little learners know and like to be reminded of. In order to do this he must, it is clear, study his pupils' tastes and germs of interest. For maintaining the interest in a subject when once it has been aroused the most general prescription is that of Prof. James: "the subject must be made to show new aspects of itself; to prompt new questions; in a word, to change".[1] A judicious use should be made of the attitude of *expectant attention*, of curiosity as to what is coming, so as to secure the full energy of the focussing act.

The chief difficulty and danger here is that though it is comparatively easy to make children *somehow* interested in a thing it is very much more difficult to arouse in them the particular interest required by the teacher. As we have seen, each interest has its own point of view, and therefore it by no means follows that two people who are interested in the same *object* have the same interest in it. Many classes "sit entranced as the teacher shows pictures . . . but they have no interest whatever in the principle . . . which the pictures are to illustrate." Prof. Thorndike gives an amusing illustration of the point in a question about Miss Bessie who had illustrated a geyser and a volcano respectively, by means of a ball with a hole in it buried in sand, and a bit of cotton soaked

[1] W. James, *Talks to Teachers*, p. 103.

in alcohol. As a result, at their next geography lesson the children clamoured for "the fireworks" and "the squirt"![1]

As the pupil grows, more should be required in the shape of voluntary effort, which will prepare the way for a full command and free direction of the energies of attention. Our tendency to-day is perhaps to lay too much weight on making school-work pleasant in all stages of growth, and to overlook the important part which the will to attend plays in all methodical learning. The prolonged brooding attention which leads to a penetrating insight into a subject can only be guaranteed by a regulative exercise of will, a determination to find out and understand. A school in which no task requiring an effort of attention was ever imposed would certainly not be a good one. Such a state of affairs is, however, practically impossible unless the standard of attainment is allowed to fall ridiculously low. "The teacher therefore need never concern himself about *inventing* occasions where effort must be called into play."[2] Thus the teacher has to insist on attention to what is comparatively dry and uninteresting. This is illustrated in the need of learning the multiplication table or the notes of the musical scale. Even in such cases, however, the judicious teacher will take care not to lose sight of his invaluable helper, interest. He will try when possible to invest even the dry details of a subject with some measure of attractiveness; and, what is more important, he will regard the severer efforts to attend as necessary stepping-stones to the attainment of a new and wider interest in things, in what at first looked so dry and repellent.[3] For the rest, the teacher must see that the motives appealed to "have as much connection with the subject-matter of the lesson as possible," and that the

[1] *The Principles of Teaching*, p. 58.
[2] W. James, *Talks to Teachers*, p. 110.
[3] Volkmann remarks that the older pædagogic had as its rule, "Make your instruction interesting"; whereas the newer has the precept, "Instruct in such a way that an interest may awake and remain active for life".

final aim be "to convert voluntary attention into spontaneous," that is interested attention.[1]

A good deal of children's inattention is no doubt connected with that volitional or "moral" defect which we call *indolence*. A teacher who has satisfied himself that his pupil is really capable of putting forth the exertion needed for steady and persistent attention to a subject, may rightly insist on his making the effort. The difficulty here is to distinguish between the effect of insufficient vigour of brain and that of defective motive. The proper mode of appealing to a child so as to awaken the necessary effort is a subject that belongs to the training of the will.

NOTES.

NOTE A (p. 118).—The question has been discussed whether more than two grades or levels of consciousness should be recognised by the psychologist. The generally accepted view is that which recognises two clearly distinguishable grades, the dimly-conscious or marginal and the clearly conscious or focal. See Titchener, *Lectures on the Psychology of Feeling and Attention*, pp. 220 ff.

NOTE B (p. 120).—The question how far attention increases the intensity of a sensation has been much discussed of late. It cannot effect an increase in the sense in which an increase in the intensity of the stimulus increases it. It is probable that what it really effects is greater clearness, including the sharper definition of the intensity as well as of the other presentative characters. See Stout, *Groundwork*, pp. 56, 57; Pillsbury, *Attention*, pp. 3 ff.; Titchener, *op. cit.*, pp. 211 ff.

NOTE C (p. 125).—It has been found that if letters which do not form words are presented to one for an instant as many as four or five can be presented together and yet retained. This, however, probably does not mean that four or five ungroupable letters can be attended to *together*, but rather that "the result of a single glance persists long enough for four or five acts of attention to take place".—Pillsbury, *op. cit.*, p. 83. On the whole subject of the area of attention the student who desires further guidance may consult Pillsbury, *op. cit.*, pp. 65 ff. and Titchener, *op. cit.*, pp. 259 ff.

[1] Stout, *Groundwork*, pp. 52, 53.

NOTE D (p. 133).—Among the curiosities of modern psychological literature is the effort to eject feeling from the psychological niche which it first won through Kant. As we shall see later, it is being thrust away on two sides, that of sensation as well as that of attention; for the present we are concerned with the latter. The newer view of attention and interest challenges the claim of interest as a mode of feeling to be a condition of attention. Interest, it would appear, simply *is* attention, or—as if that were not startling enough—is a *product* of it. The theory of interaction of feeling and conative activity adopted in the text, even if at the moment unfashionable, saves one at any rate from strained if not wholly fanciful hypotheses. The student who wishes to be abreast of the subtleties of this new theorising should consult Stout, *Analytic Psychology*, i., pp. 224 ff.; Pillsbury, *op. cit.*, chap. iv., and Titchener, *op. cit.*, Lecture VIII.

CHAPTER VII.

PERCEPTION THROUGH THE SENSES.

ATTENTION to sensations, their characteristics and relations, leads to the first stage of what we have called the intellectual elaboration of sense-material. It comes upon the psychical scene as soon as a child begins to distinguish and recognise an object, say the mother's face.

Perception is a true process of cognition, and as such must be carefully distinguished from sensation. An infant has experiences of vague sensation, as when a sudden noise strikes its ear, before it is able to put meaning into the sensational change, and to apprehend its external source or the object which causes it. The earlier state is one of comparatively passive receptivity, the later involves strenuous mental activity. The product of this perceptual activity is often spoken of as a Percept.

Distinction between Sensation and Perception. We may illustrate the difference between sensation and perception by taking two simple visual experiences. Suppose that our eyes are closed and our face turned towards a brightly lit window. In this case we have a voluminous sensation of red. This extended red has no definite form or distance from the eyes. We do not see a red thing. This may be regarded as approximating to an experience of pure sensation. Suppose now we look out through the window at the sky and see a cloud sailing by, following it till it gradually disappears behind the window-frame. What is the difference between these two experiences? As sensation it is only a little more complex. The difference is quite other than mere complexity. It is that we no

longer merely *sense* colour but *see* a coloured thing, a cloud defined against a background. We have selected from the extended mass of colour-sensation a certain portion and given to this coherence or form, isolating it as a thing.

How Percepts are Reached. The seemingly simple act of perceiving a particular object, as in seeing an orange, or hearing a bell, is then the result of a process of learning. In the first weeks of life an infant has not learnt to recognise the direction of a sound—a fact clearly shown by its blank, wondering look, and the absence of an appropriate movement of the head in the direction of the sound. Still less is it able as yet to refer the sound to a definite object, for example, its mother, and to recognise the object by means of the sound.

Since perception involves an orderly grouping of sense-material, the development of the process has, broadly speaking, two distinct aspects. (*a*) The sense-material must, to some extent, become differentiated into distinct sensations which can be discriminated from one another.[1] (*b*) Certain of these sensations must be synthetised or bound up in various ways with other sensations or with other mental elements.

(*a*) **Discrimination and Assimilation of Sense-Data.** From what has been said it is evident that our ability to perceive objects depends upon and is limited by our ability to discriminate or distinguish sensations of different quality and to assimilate or recognise as alike sensations of similar quality.

Taking discrimination first, we see that until an infant begins to attend selectively now to this, now to that sensation of sight or other sense, the outer world must remain for its consciousness a chaos, if it can be said to exist at all. It is probable that at the beginning of life the many stimuli which play on the infant's sense-organs fail to excite distinct impressions. Those which affect con-

[1] The motor or kinæsthetic sensations involved are only very imperfectly discriminated—by any conscious process at least.

sciousness at all can only yield a confused blur. Thus it can attain to no clear awareness of the red of the fire, of the yellow of the gilt frame, in the way that we apprehend them, as colours each with its own distinct and definite character. At most there is at this stage a vague discrimination of patches of bright from a vaster surrounding dark.

As motor power and attention develop, sensations begin to take on more of difference. Further, as the result of repeated acts of attention, distinctions grow finer, so that not only is the very bright distinguished from the very dark, but moderate degrees of bright and dark are distinguished, as when a faint pencil stroke on paper is distinctively noted. Similarly, qualitative differences among the visual sensations come gradually to be attended to, red being distinguished from blue, and later, lesser differences noted, as that between the colour of a lemon and of an orange.

Concurrently, and in the closest connection with this, there is developed the power of assimilating the sense-material. As like impressions and groups of impressions recur, a child will, by successive directions of attention, come to recognise them as familiar, and as having a definite identity. Thus, after many hearings of the mother's or nurse's voice, the infant on again hearing the sound shows by its cessation from crying or by its joyous movements that it recognises the sound. Similarly it comes gradually, and as the result of repeated experiences, to recognise as familiar the group of visual impressions answering to its mother's face, to its bath, and other things; and as the repetitions increase in number the recognition grows easier, requiring less attention.

Discrimination and assimilation go hand in hand. A child only clearly discriminates impressions after they have recurred again and again, and so taken on something of familiarity. This is seen in his growing skill in distinguishing the mother's voice. While assimilation thus aids discrimination the latter enlarges the range of assimila-

tion. Thus by distinguishing yellow from orange he is able to recognise each as such. Or we may say that a child's recognitions remain vague until discrimination introduces definiteness of character into the sense-material. In the development of a clear-cut sensation out of the matrix of undifferentiated sense-material, the acquirement of an explicit identity and the emergence of clear differences from other sensations, are indeed but two aspects of the same process.

It should be noted further that both discrimination and assimilation presuppose that the mind is permanently modified by its impressions, so that the sensation produced by a stimulus the second time is never quite the same as the first time. It is only by virtue of this plasticity of mind (*cf.* above, p. 46) that sensations take on that definiteness which enables them to be identified or distinguished.

(*b*) **Interpretation of Sense-Data: (1) Synthesis.** Perception goes beyond the discrimination and assimilation of sensations. Before we can reach a percept, even so simple as that of the moving cloud, sense-material has to be integrated into structural wholes, *e.g.*, the various gradations of light and shade and the boundary lines of the cloud; and in close connection with the integration there has to be an acquisition of *meaning*. Before I can apprehend a certain kind of sound, as the tinkling of a bell or the barking of a dog, experience must have begun its integrative work by investing the sense-impression with something which was not there originally. We will first consider the process of synthetic welding of sense-material, then the process of investing it with meaning.

In the case of the higher senses, with which perception is specially connected, sensations, though they may appear as isolated experiences, *e.g.*, a momentary flicker of light or a cry in a quiet country walk at night, are apt to come in complex masses, as when we hear a chorus of birds' song or look at a landscape. In all these groups the constituent sensations will disclose certain formal relations one

to the other. Thus the sounds will occur together or follow one another: the colours will take on certain formal relations from their spatial arrangement, as contiguous or separated by another colour, as lying one to the right of another, and so on. A simple example of such formal co-ordination of sense-elements is the temporal form of a series of sounds produced by regular tappings. Each tap, though qualitatively similar to the others, will be differentiated from these by its unique position in the series, as may be seen at once by comparing the first, last, and any intermediate member of the series. That is to say, a definite position in a temporal whole modifies the character of the element. This modification of character will be increased as the form of the series becomes less simple, as for example when the regular taps break up into rhythmic groups of triplets, etc. It is to be noted that the apprehension of such a temporal series as a whole implies that when the later members present themselves the earlier ones temporarily persist in some dim image-like form.[1]

A simple type of spatial synthesis may be illustrated by a series of columns in a portico. In this case, too, each column, while in itself precisely similar to the others, will acquire its own peculiar *positional* character or aspect. In this case, however, the synthesis is facilitated by the fact that all the elements are sensed at the same moment, though some more clearly than others; and further by the circumstance that attention can move freely to and fro from any one to any other constituent.

Both the temporal and spatial syntheses and the modifications of elements just illustrated imply that our sense-experience does not consist in a series of discrete jerky units. As was pointed out in the previous chapter, in attending to a selected visual or other element we apprehend it against a dim background, or as William James puts it, we never have a discrete element of experience without a fringe of relations, these relations including, in addition to

[1] The persistence may be merely that of the physiological equivalents of the images here supposed.

qualitative dissimilarity and similarity, the formal temporal and spatial relations just considered.

This synthesis and concurrent modification of elements is specially marked in the case of more concrete spatial forms, such as that of the cloud. Here, as we shall see presently, continuity of part with part, and the limiting of the whole group by a contour or boundary, give to the whole a special coherence and unity.

The facts here touched on show that in a temporal or spatial synthesis not only is the whole determined by its parts—any change in one of the latter altering the former—but, reciprocally, every detail is modified by the whole to which it belongs, being other than it would be in a different whole, as well as other than it would be if it had another position in the same whole. We may say then that these formal syntheses constitute rudimentary *systems* in which the parts interact with the whole and with one another.

(2) **Acquirement of Meaning.** By perceptual meaning we understand any modification of sense-material by which, though no clear image is called up, it acquires a certain kind of suggestiveness, seeming to point to something other than itself. The sound of a bell has meaning in this sense of the word: the sound seems to point to, to signify, a bell ringing. This implies that the sense-material has become complicated with a quasi-imaginative element—a suggestion of something not actually present at the moment.

This significant adjunct has been called a "tied image" to distinguish it from the free detached form which, as we have seen, appears later. It seems to vary from a faint rudiment, a mere *tendency* to image, up to something approaching a clear free image. In general, however, "perceptual meaning" stands out less distinctly from the sense-presentation than the meaning of a word stands out from the sound or visual symbol of the word.

The modifications of character in the members of the temporal and spatial groups illustrated above are said to introduce meaning. (1) The term "meaning," however,

is better confined to cases in which what is presented points to something not present—whether distinctly or indistinctly. Thus in a long series—say the notes of a tune or the letters of the alphabet—we can speak of "meaning," since there is something like a suggestion of the later portions by the earlier, and conversely. But the more striking illustrations of meaning occur when sensuous material is modified, not by its present surroundings and attachments, but by past experience. This implies more than temporary persistence of sensations, namely, retentiveness (compare above, p. 69). The experience may be homogeneous with the new sense-complex, as when on seeing a part of a human figure we mentally reconstruct the whole; or it may be heterogeneous, as when a glowing fire *looks* warm, or a certain kind of sound is instantly greeted with the exclamation "That's the gong!" These two examples are selected as illustrating the extreme cases of meaning. The fire *looks* warm because meaning is in this case partially submerged in and fused with sensation; whereas when the sound is interpreted there is a tendency to image the servant striking the gong.[1]

Synthesis of sense-elements and development of meaning are the two fundamental processes in the elaborative and interpretative part of perception. We may now proceed to illustrate their mode of working in the more concrete perceptions of everyday experience. Here we shall be concerned largely with the perception of objects in space through the senses of touch and sight, which are specially endowed for the purpose (see pp. 99, 108). It will be convenient to treat separately the perception of space or space-relations and the perception of object or thing. But in doing this we must not be misled into thinking that the two processes actually occur apart. A child in exploring the external world is not concerned with abstract space: strictly speaking he never sees space. What he perceives is an object or objects having spatial relations, internal

[1] The student should compare the account of perceptual meaning given by Stout, *op. cit.*, pp. 94 ff., and *Analyt. Psychology*, ii., pp. 26 ff.

relations between the several parts of the object, and external relations between the object as a whole and other objects.

Perception of Space. In considering this we shall have to inquire a little more closely into the particular mode of synthesis briefly described above as spatial form. We shall here refer mainly to the tactual perception of space, reserving for a moment the question of the differences between this and the visual perception.

To understand this spatial perception we need to go back to those distinguishing features of the sense-experience of touch and sight which we called extensity and discrimination of points (see above, p. 99). How far these features constitute in themselves a vague sort of space-consciousness is a disputed point. What is certain is that they supply the necessary congenital basis for the development of such a consciousness. If an infant did not at first sense a continuous spread or volume of contact when pressed to the mother's breast, and did not somehow distinguish tactual sensations, perfectly similar in quality and intensity, as locally different—say those of the foot and the hand, of the tip of the first and of the second finger of the same hand, he would have no starting-point for advancing to a clear space-perception.

These two endowments together supply the essentials of spatial synthesis. The extensity sensed when, say, a biscuit is laid on a child's hand, gives the continuity of space. On the other hand, the breaking up of this continuity into a number of isolated experiences when the mother playfully taps this and that point of the child's hand with a pencil-point, supplies the condition of discriminating the several constituents of this mass and of establishing definite relations between point and point. As the foundation of all definite knowledge of locality, the differences sensed in this isolating mode of touching have been called Local Signs.

Both the extensity and the local differentiation of character must be assumed to be very vague at first; the

child begins by feeling but dimly the size and shape of the biscuit, the position of the particular cutaneous point touched. Both grow in clearness as the tactual organ is exercised. The local signs become clearer as isolated experiences of touch at different parts of the skin occur, and attention is given to these as isolated; and as a result of this the continuity felt when these are massed together, as in touching the surface of the biscuit, becomes more definite, taking on the aspect of a system of related parts.

The great instrument in effecting this development of a spatial synthesis of distinguishable elements is movement. When, for example, a fly happens to crawl over the child's hand a whole series of cutaneous points is stimulated. Movements as changes tend, as we have seen, to excite attention, and so the child will be led by such experiences as that of the crawling fly to discriminate the local elements better, as well as to apprehend their relations as lying nearer or further apart in the series. It should be noted, further, that there is a pressing practical need which urges the child to attend to these characters. When he feels what he takes to be a fly creeping up his leg he wants to get at it. But he can only carry out the required movement with precision when he knows something about its whereabouts at the moment. That is to say, he must discriminate the spot by means of his local signs.[1]

Movement and Spatial Perception. The fact just referred to illustrates one aspect of the close connection between movement and the development of space-perception. We may now pass to another aspect. Not only are a child's movements guided and controlled by a growingly clear apprehension of local differences of sensation and their relations, but they play an important part in the development of this apprehension. Let us suppose that a child, instead of having his hand crawled over by a fly, himself carries out this little expedition by exploring

[1] It is held by some that movements to different parts of the body are in a measure reflex, and that these reflexes contribute the local signs.

the palm of his left hand with a finger of the right. Now this movement, too, will lead to the discriminative analysis of elements and to their co-ordination as related parts of a whole. But it will effect much more than this. The series of tactual experiences with their distinctive signs are now accompanied by a series of dissimilar, namely motor, sensations. To each locally differenced tactual sensation there corresponds a phase of the continuous complex of motor sensations involved. If the movement is reversed the double series remains the same, only that the order is reversed.

Such movements must, it is evident, serve to make the relations among the points touched more clear. A given point, p^1, will be marked off from another, p^2, by a motor experience varying qualitatively with the direction of the movement and having a certain duration, which (the rapidity of the movement being supposed to be constant) measures the length of the path traversed. Observation will show that an infant is much occupied in tactually exploring his bodily territory, and these excursions must tend to bring more and more clearness into his tactual perceptions of locality, distance, etc.

The co-ordination in this way of a series of motor, with one of tactual sensations, will, by repetition of the experience, lead to a close connection and partial fusion of the two. As a result of this, each series, when occurring alone, will be modified by taking on meaning derived from its association with the other. Thus when the child grows older the experience of having a biscuit put into his hand will be complicated by faint rudimentary traces of the movements previously executed in exploring the surface touched. In like manner, when in the dark he moves his eye the movement will be complicated by a faint image of the horizontal or other line traversed.

While movement thus assists in tactual localisation and the perception of spatial form of two dimensions, it also plays the chief part in the perception of distance. The mobile arm reaches out into space, and the duration of

the series of motor sensations measures for us the distance. In the case of longer distances locomotion supplements arm-movements. In this way active touch supplies, as the experience of the blind tells us, the basis for a complete space-perception (Note A).

Differences of Tactual and Visual Perception. The tactual perception of space is treated by psychology as the more fundamental form. By movements of the hands and fingers we experimentally investigate space-relations, as when handling and feeling the form of a statuette, in a direct and intimate way which is not possible in the case of sight. Compared with the spatial forms apprehended by touch those apprehended by sight appear remote and relatively unreal. Yet in another way visual perception greatly transcends tactual. One has only to compare the maximum range of tangible space apprehensible at one moment by touch with that perceptible by sight, as in looking at a wide expanse of country.

The visual perception of space is a large and highly technical subject and can only be glanced at here. As already pointed out, the retinal surfaces offer the conditions for a development of a space-perception similar to that traced in the case of tactual perception. The visual extensity, like the tactual, begins to be analysed, and its isolated parts to be distinguished and related, every time the image of a moving object, such as a bird, slides over the retina. Movement helps in this case, too, to map out with greater definiteness the system of points implicit in the continuous impression. The practical need of seeing clearly compels the infant to acquire at an early date a readiness in moving the eye to the right or to the left so as to bring the retinal image of the object observed upon the central area of clear vision.[1] Such movements serve as the equivalents of the finger movements illustrated

[1] The student must beware of the not uncommon misapprehension that in moving the eye we know anything about the retina and its images. Our consciousness is wholly occupied with the visual object and the rendering of this clearer.

above, making at once the local characters of the several points and their relations more explicit. The co-ordination of the system of points in visual perception will naturally be about the central area of perfect vision.

As observed already, sight lacks the arrangement by which the hand reaches out into space and measures the distance of an object; the eye confined in its socket cannot move outwards from the body as the hand moves. Yet it develops a fairly complete perception of distance. The account of the way in which it manages to do so is one of the most fascinating chapters in psychology. It tells us of processes which for adults have long since sunk irrecoverably below the threshold of consciousness, of the use, as distance-signs, of sensations, of the very existence of which we were unaware previous to a study of psychology. Only a brief résumé of this part of the theory of perception can be given here.

Of these visual signs of distance or depth the chief are (1) the kinæsthetic sensations due to convergence and accommodation, and (2) visual or apparent magnitude. For all shorter distances, the sensations depending upon the degree of convergence are much the more important. The right degree of convergence is itself indicated by the absence of those "double images" of an object which arise when the eye is focussed for a point nearer or further off than the object. How much less efficient as a sign of distance is the degree of accommodation, can be proved by keeping one eye covered for some time and then trying to perceive the exact distances of various objects in the visual field.

For more distant objects the variation required in convergence and accommodation is so slight as to be useless. Here the chief sign is apparent magnitude. The image thrown by a given object on the retina is smaller the more remote is the object. Thus the apparent magnitude depends conjointly upon the real magnitude and the distance, and, if either of these two is known, serves as a measure of the other. It follows that it can be a sign of distance only for objects of known size, such as a man, a church, a tree.

It helps us only a little for such things as steamers which vary greatly in size, and not at all for a thing of unknown magnitude such as the moon. The converse of all this will of course hold for the perceptual determination of the object's real magnitude. Thus we cannot see the moon's size because we cannot see its distance. Besides the signs of distance already mentioned there are others, less direct and constant. Thus distant objects appear less distinct and hard than near ones; their outlines are not so sharp, contrasts of light and shade are toned down, and colours modified. Such signs, however, depend upon and vary with atmospheric conditions. Thus the mountains of Scotland loom gigantic because they are judged to be farther than they are in the thick misty air, whereas those of Switzerland, standing out sharp and clear with local colours well preserved, look smaller than they are.

Slightly different from the visual perception of distance is that of relief or solidity. In looking at a flat picture of an object each retina receives a precisely similar image, and so the two visual sensations, being indistinguishable, coalesce. But in looking at a solid object, say a book, the two images and corresponding sense-impressions differ. Thus if the book is held a little in front of the face with its back towards the observer, his left eye sees more of the left cover, and his right eye, more of the right. The fact that the perception of solidity depends on the partial dissimilarity of the visual impressions is proved by the stereoscope, in which the two drawings, seen by the right and the left eye respectively, are taken from slightly different points of view, and so secure for the two eyes just that amount of dissimilarity of impression which is present when we look at a solid body. It is through some vague consciousness of this dissimilarity that a child learns to *see* the third dimension of objects, to construct visual solids, and to distinguish them from flat drawings.

Relation of Visual to Tactual Perception of Space. The experience of touching an object is qualitatively different from that of seeing. Yet the spatial perceptions developed

are, as we have seen, in their main features similar. Not only so, the development of the one proceeds in closest association with that of the other. A child in moving his hand to reach an object follows the movement with his eye: the tactual and the visual perception of the object become in this way closely conjoined and synthetised. As a result of this synthesis each acquires a meaning in relation to the other. When with active touch I examine the form of an object in a dark room I tend to visualise its form also; and when I look at an object, say a brick, I tend to reinstate the experience of feeling its shape. This partial fusion of tactual and visual experiences, with a consequent development of meaning, is most strikingly illustrated in the acquisition of extra-visual meaning by the perceptions of sight. The well-known theory of visual perception originated by Bishop Berkeley ascribed the visual perception of distance to suggestions of experiences of active touch: in seeing an object as so far off we are reading off certain visual signs of what we should experience if we moved the arm or the whole body towards the object. We have seen, however, that sight is, to some extent, capable of constructing its own world of spatially determined and spatially related forms. What a purely visual perception of these would be like, however, had no experience of the moving limbs become complicated with it and thereby modified it, we cannot say, since there never was a person who could see and not touch. But the full, clear, tactual perceptions reached by the blind suggest that the influence of touch on sight must be a profound one.

While the spatial perceptions of touch and sight are thus correlated, the perception of space as a whole is co-ordinated with that of time. The experience by which this co-adjustment of the two types of formal synthesis is best effected is movement. When an object moves, its changes of position assume the form of a successive series. Yet the successive positions themselves are perceived to be in space, and the whole series thus assumes a spatial form. The two series correspond throughout, relations of con-

tiguity, proximity and remoteness being the same for the temporal and for the spatial series. Hence in speaking of movement we can (by assuming a fixed rate of movement) speak indifferently of so much time occupied or of so much space traversed. The spatial series of the movement of the hands of a clock measures out time for us, and conversely in everyday language we measure distance in terms of time, as when we speak of the distance from one village to another as an hour (*e.g.*, "heure" and "petite heure"; "Stunde" and "Stündchen"; compare the Italian "mezzoretto" or short half-hour).

Perception of Object. Having considered so far as possible the perception of space apart from objects, we may now turn to the perception of the things which are in space and give concreteness and reality to our perceptual experience. The first of these to claim our attention is our own body, and a short account of the way in which we come to perceive this may fitly preface our examination of the perception of external objects.

Perception of our own Body. In the account of the tactual perception of space reference was continually made to the body. The localisation of tactual sensation on the bodily surface is involved in the perception of the spatial aspect of an external object brought into contact with it. Our own body, unlike external objects, is always present and can be perceived at any moment. It has, too, an unique interest for the child, since whatever part he touches he experiences a second sensation localised in the part touched. As a consequence we find that the infant soon begins to treat his body with a gravely scrutinising attention. As a result he comes to know his body in a way in which he knows no other object. He cannot, to be sure, perceive certain parts of its surface either with hand or with eye; but what he can reach he knows well. How finely he learns to map out the surface of his body is illustrated in the fact that its various parts will serve him through life as natural measures of space magnitude in general. The very names of many of our measures, *e.g.* "foot," "hand," "span," show this.

The internal parts can be known only indirectly and vaguely; and that this knowledge comes slowly is seen in the amazing schemes of anatomy which some children have thought out for themselves.

The body stands intermediate between the "self," in the most subjective sense, and things which are "external" to this, that is to say, outside the bodily, or better, *embodied* self. It is not only always near the exploring hand or eye, it is more intimately conjoined with the self, forming indeed its frame-work or envelope. This way of viewing the body comes from the experience of the close connection between what goes on in it and the sensations generally and the feelings. If, in his first awkward attempts at arm-movement, a child gives himself a blow he has a disagreeable sensation. When his body is hurt by falling or otherwise, he suffers, while soft strokings of the body give immediate pleasure. He begins too at an early date to have glimmerings of the whereabouts of his internal discomforts, his dyspeptic troubles and the rest. In these ways his body, while perceived as a thing just like a foreign object, is felt to be a part of himself.

It may be added that the body and the correlated sensations throw into relief the temporal aspect of things and so supply training in temporal perception. All the bodily processes are more or less regularly rhythmic, from the beating of the heart and respiration up to the recurring needs for food and sleep. Moreover, the normal speed of movement of the several limbs is more or less definitely determined, the child taking many more steps to the minute than the long-legged adult; and such limitations, by helping to determine the child's "psychic tempo," also influence his perception of time-relations.

Perception of External Objects (*a*) **Spatial Form.** The perception of an external object means primarily, as we have seen, the perception of something external to the bodily self. The child sets out from his body as starting-point in all his judgments of direction and distance, for example, to the right a few feet off. The perception of the object,

like that of our body, means, first, a clear apprehension of its spatial form, a cube, sphere, or a less regular form. This perception of formal aspect, it is to be noted, develops in normal individuals to a certain, more or less fixed, degree of perfection, and, though it is reached by perceiving particular things, yet the power thus acquired is, within limits, the power of perceiving form in any new spatial object. Not only so, the spatial form of an object is the most fundamental element in the perception of it, in as much as we can recognise a thing by this even though its qualitative character is varied. Thus an object can be recognised from a black and white drawing or mere outline, but not from a formless juxtaposition of its mere colours. This answers to the fact in temporal perception that, as E. Gurney pointed out, rhythm is so fundamental a part of melody, that if the notes of a tune are arranged in any other rhythmic series we no longer recognise it.[1]

The perception of the forms of external objects develops in close connection with that of the bodily surface. Thus the knowledge of the concave surface of the palm helps a child to feel the spherical form of a ball as soon as he takes it into his hand. Similarly the concave roundness of the ring is felt when it is slipped on to the convex finger. The perception of the whole of a complex form means the discrimination of many elements and the establishment of a whole network of relations among these. This is illustrated in the apprehension of the form of a church façade with its horizontal and vertical divisions, its windows and doorways. A still more elaborate synthesis of elements is required for the perception of a whole building from outside.

(*b*) **Spatial Unity of Object.** The perception of the unity of an object touched is determined in part by a previous knowledge of the part or parts touching it. This is strikingly illustrated in the so-called Aristotle's Experiment. If the second finger is crossed behind the first, and then

[1] See his volume, *The Power of Sound*, pp. 151 ff.

some thin object such as a pencil be moved up and down in the V-shaped space between the finger tips, the pencil will be felt as double. The explanation of this illusion is that the two finger surfaces touched are ones which in the normal position of the fingers are separated by the thickness of the two fingers. Anything brought into contact with them will accordingly be felt as two things separated by this distance.

The features in the object itself which help us to see it as a single thing have been indicated above. We assume in the case of ordinary objects a continuous spatial whole bounded by an outline or contour. These being given, the first thing required is detachment from adjacent forms. The heavenly bodies, save in the rare overlappings of sun and moon, present in the intervals of space between them this perfect detachment. When a spatial interval is wanting, a movement of the object will, as our illustration of the cloud shows, help us to recognise the separateness of an object. Our own muscular activity materially aids in this isolating detachment, as when we take the cover from a teapot and so give it a separate unity. It is to be noted that the spatial unity of an object is only vaguely definable, one and the same object, as a mountain or a human nose, appearing both as a part of an object and as a separate one according to the point of view.

(*c*) **Grouping of Qualities.** An object has, besides form, a number of qualities which are said to co-inhere in it. Thus the tangible object is hard, cold, or what not, the visible object bright and coloured. These qualities are synthetised much as the parts of a spatial whole are synthetised; only in this case the grouping which results, being merely qualitative, has no definite form or order of arrangement. We have no reason to say of the qualities of a knife-blade, for example, hard-smooth-cold rather than smooth-hard-cold. In this case, too, we note that while some constituents of the whole are actually presented others are only represented. Thus in looking at a gold watch the colour is presented along with the form, whereas

the other qualities, such as coldness and hardness, form a part of the revived meaning in the percept.

(*d*) **Material Reality of Object.** What we mean by an object is, however, more than a mere synthesis of spatial and qualitative elements. The table we touch has a reality of its own. The "sense" of this reality is not present, at any rate in a clear form, in the early stages of consciousness, but has to be developed by means of a number of experiences. In this development the knowledge of our own body plays an important part. While we set the body *as ours* in antithesis to external things, in ascribing independent reality to these we necessarily take the body as our model and standard. Now this way of envisaging an external object means that we regard it in a vague way as a kind of living organism which envelops a conscious self. In other words, there is a kind of projection of the self into the external object. That children are wont to ascribe life and personality to external objects generally is a familiar fact. Even the stationary "lifeless" stone acquires a kind of rudimentary "self" for the child's fancy.[1]

Material reality is "tangible". We get into grip with it through experiences of active touch. These supply together in sharp antithesis experience depending on my own activity and experience which is independent of this and limits it. Thus a child finds that though he can run into the next room, the finding there of a toy which he wants depends on conditions apart from his activity. The experience which brings home most impressively the distinction between what we effect and do not effect by motor activity is that of unexpectedly encountering an obstacle to movement, as when a child rushing wildly runs against a wall or chair. This experience of something resisting and tending to thwart our activity is probably fundamental in the development of the perception of a thing as a material reality. Prof. Croom Robertson

[1] For illustrations of this personifying tendency in children, see the author's *Studies of Childhood*, pp. 30 ff. The self-projecting character of children's perceptions is emphasised by Meumann, *Exper. Päd.*, i., pp. 123 f.

used to say in his lectures that "the first psychological meaning of Object is Obstacle".[1] The experience is interpreted by the analogy of what happens when the child presses the hands one against the other. That is to say, something corresponding to his own motor impulse and volitional power is projected into the obstacle. When this analogue of our own activity is thus incorporated into the object of perception the latter acquires an independent reality analogous to that of our own body.

A similar use of the analogy to our own body appears in other aspects of the perception of reality. One of these is its persistence in time. This continuity of existence is clearly a part of what we understand by the unity of the object: the object is one in the sense that what I now see is the same object which I saw yesterday. Now we cannot directly perceive this continuity in time: for all that we can see or feel, every time we go out of a room the chairs and other objects may vanish into smoke. But our own body being always accessible to perception is known to be permanent, and by carrying over this permanence to external objects we regard them as permanent too.

In this case, again, the analogical transference covers the body's companion, the subjective self. This conscious self which controls all the parts of the body is its deeper uniting principle; and by projecting an analogue of it into an external object, the child makes it participate in this unity. The same projection of a "self" supplies him with a deeper basis of continuous existence. As he knows himself to be always more or less alive and conscious, so he regards other things as having their analogous continuity of life.

The processes here described are less familiar to the adult. Yet traces of them are discoverable in our more mature perceptions. When one kicks the shin against a chair the strong language apt to be used points to a

[1] I am indebted to Dr. Hubert Foston for this version of Robertson's dictum (*cf.* Robertson's published *Lectures: Elements of Psychology*, p. 110).

surviving tendency to ascribe to inanimate things something analogous to our own impulses. Indeed our language, including that of science itself, is reminiscent of this primitive impulse, as in speaking of the pressure of a weight, and of the forces of nature generally.

Summary of Perceptual Process. We may now summarise the chief factors which co-operate in the perceptual construction of things.

(1) Differentiation and assimilation of sense-material into definite sensations.

(2) Spatial and temporal "insulation" of certain groups of sensations, especially in touch and sight, as described above.

(3) The welding together of such groups by attention to them as wholes and by movements of attention within them.

(4) Retentiveness leading on to the incorporation into the last of meaning.

(5) The perception of movement as helping to correlate space and time.

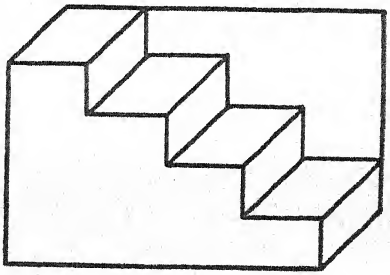
(6) Perception of the bodily self, and "self-projection," facilitating the attribution of material given through different senses, and at different times and places, to a permanent unity and independent reality, the "thing".

(7) Subjective selection determining what presentations shall be attended to and what qualities shall form part of the meaning.

Perception and Apperception.

Apperception involved in Perception. Consider the "staircase figure" here reproduced. This is seen as the representation of a solid (*i.e.*, the staircase); a fact of which the student may easily convince himself by asking himself whether the staircase is viewed from above or below. He will find that he can answer this question without hesitation; and yet if he continues to fix his eye on it he will suddenly catch himself seeing it from the

other point of view, the figure appearing, as it were, instantly to obvert itself before his eyes. In any case he can bring about this change of aspect by trying to view it in the required manner. It is evident that in thus seeing a flat figure as solid in this way, meaning in the full sense, as defined above, is involved, since we are reading something into what is presented, supplementing the given by the not-given. This kind of cognition, in which meaning derived from past experience combines with a spatial whole presented, so as to be hardly if at all distinguishable from it, is known as *apperception*. The term is valuable as emphasising that all the elements supplementary to bare perception and combining with it, are not merely



revived by the presentation, but that they may manifest themselves by modifying the presentation, and often by this alone. We seem to be as directly aware of qualities which we "read into" things as of those which are really presented.

The relation between perception and apperception is, then, the following. Perception in an abstract sense, as the apprehension only of what is presented in its spatial (or temporal) form, may be regarded as distinct from apperception. Yet in the concrete or customary sense it always involves some amount of apperception.

It follows that apperception is essential in all observation which goes beyond a mere cataloguing of sense-

qualities and their grouping, and includes a recognising or classing of the object in any of its aspects. And since, as we shall see later, apperception has no upper limit, but may involve mental processes of any degree of complexity, the complete cognition of a thing presented through the senses—known as the *intuition* (Anschauung) of a thing—may involve vastly more than simple perception. It may be said that with animals apperception remains on the *perceptual plane*,' involving only the results of previous acts of perception. With children, however, apperception soon begins to transcend this plane and to involve simple forms of thought. This certainly holds good of the observation with which the teacher is concerned.

Preperception and Suggestion. We have so far spoken as though the elements which are supplied by the mind in apperception were always due to a previous perceptual experience of the same thing and were excited by the new presentation. This is, however, not necessarily the case. These supplementary elements or "apperceiving mass" may be excited independently of the presentation and before it occurs. When they take the form of an expectation that the presentation will be of a certain kind the apperception is sometimes called *preperception*. Thus if one looks at the staircase figure with the expectation or intention of seeing the staircase from below and in consequence sees it thus, the case is one of preperception.

The exciting of such a preperception is what is meant by *Suggestion* in the narrower sense.[1] Thus if one be asked, after looking at two objects which are unequal in size though of the same weight, to decide by lifting them which is the heavier, one tends to overestimate the larger because its greater size arouses an expectation of greater weight. Again, experiments have been made by throwing up a ball three or four times and then *pretending* to throw it up again. "Of the 165 children witnessing the experiment 78 answered to seeing the ball go up and dis-

[1] Suggestion in the wider sense will be dealt with in chapter ix.

appear."[1] Binet and Henri presented a number of bottles filled with wadding to their subjects, assuring them that the bottles had faint odours of rose, vanilla, etc., and asking them if they could detect the odour. In reality only one bottle had any odour at all, yet of the eight subjects only one was uninfluenced by the suggestion.[2] Children are more "suggestible" than adults, the most suggestible age being about nine.[3] As is well known, in hypnotic states suggestibility is very greatly increased, and in some pathological conditions there is constant auto-suggestion, *i.e.*, suggestion due to subjective causes such as fixed ideas.

NOTES

NOTE A. (p. 160).—What is the exact part taken by movement in the development of the space consciousness is a point not yet determined. Psychologists like Herbert Spencer and A. Bain make motor experience the main source of the cognition of spatial relations. To-day there is a tendency to regard it as aiding in the development of the perception merely by facilitating the analytic isolating attention to the several details implicit in the primordial extensity. But the theory of psychological synthesis requires us to say that the several elements and series in the cutaneous and retinal extensity *must* be modified by the frequent concomitance of corresponding elements and series of motor experiences. The admitted fact that the perception of one dimension of space, namely depth or distance, is gained by motor experience, strongly supports this conclusion.

[1] E. L. Thorndike, *Notes on Child Study*, p. 121.
[2] L. W. Stern, *op. cit.*, p. 98.
[3] *Ibid.*, p. 95; Thorndike, *op. cit.*, p. 121.

CHAPTER VIII.

PERCEPTION (*continued*).

Analytic Perception of Form. In the preceding chapter we have seen that perception is from the first a relating, a holding before the mind of a group of sense-materials related according to a certain form. This perceptual synthesis does not, however, imply that we perceive relations in themselves apart from the things.

The relations implicit in extensity become explicit by being attended to analytically one at a time. This analytic attention is usually carried out by movement of the sense-organ. Thus to get a clear and exact knowledge by touch of the form of an object, as a cube, we do not merely hold it in the hand, but move the hand about over it, so singling out now this side, now this edge, now this angle, and then relating these by passing from one to another. So with sight, we move the eye, observing the object part by part and relation by relation. We do not necessarily follow the contours of the thing continuously, so as to reproduce the outline in the same order in terms of our own movement either in touch or in sight (Note A). Moreover, where actual movement is excluded, movements of the attention may to some extent replace it. Experiments have been made to test how far a simple but unfamiliar form can be reproduced when movement, both of sense-organ and of the attention, is inhibited; the results show that one is wholly unable to reproduce even quite simple *unfamiliar* forms in these circumstances.[1]

[1] Meumann, *op. cit.*, ii., pp. 378 ff.

Apperceptual Interpretation in the Observation of Form. As has been hinted already, and will appear more fully later, the observation which subserves the gaining of knowledge is always apperceptual. There must be some more or less definite point of view and special interest, so that the thing is observed as to its form or its colouring, its position, as to some group of qualities which shall determine whether it belongs to a particular class of things, and so on.

From what has been said about our perception of space relations, especially through sight, it is now clear that even when we wish to observe only a thing's form and size, the process is not so simple as it would seem. We say that we see "a chair" whether it is seen full, or edgewise, or upside down, or from above; that we see railway lines as parallel and not as converging.[1] In all these cases we apprehend the qualities, size or shape of the real *permanent* thing, and we neglect or discount its changing momentary appearance, its aspect from a particular point of view. Thus the chair is seen as having a square seat though a photograph would show it as square only from one point of view. The forms and sizes that we see are not those presented but standardised ones; we see not what is actually before our eyes but our interpretation of this. If we look steadily at an upright cross + and then project its after-image upon a wall inclined to us at an angle, we see not an upright but a slanting cross × on the wall, since a slanting cross on the wall would appear upright from that point of view.

Now this interpretation is necessary if we are to see and recognise *things* at all. Correct observation is not the seeing of the particular appearance, but the interpreting of it correctly. Moreover, this interpreting cannot be carried out with sufficient rapidity if it is done consciously. To calculate exactly how lines should appear from a particular point of view in order to be in reality parallel is

[1] *Cf.* W. James, *Psychology*, pp. 344 f.

a difficult proceeding, but our eye tells us in a flash whether they are parallel or not. So little do we in general attend to mere appearance, that we should pretty certainly become as incapable of seeing the appearance of things as we are of seeing their inverted retinal images, if it were not that man is among other things a *picturing* animal. He tries to represent things, becomes interested in their æsthetic aspect as distinguished from their practical significance, and so is forced to attend to them as they appear and not as they are. Yet we must remember that a child's perceptions develop at a rapid pace, and practical interests compel him to attend rather to practical meaning than to appearance. So that in a child's case, also, the look of the particular object is apt to be neglected. This is clearly shown by his characteristic way of drawing familiar objects.

Apperception as Recognition. Apperception comes into perception in another way, namely, in recognising the object perceived as a concrete whole. Such recognition is obviously involved in the perception of the identity of an object already referred to. The process will, if the object is a sufficiently familiar one, be a simple instantaneous act, and may grow automatic. Thus we recognise at a glance a member of our family or our walking stick in its customary corner. When, however, the object presents itself but rarely, or has become unfamiliar by long absence, or has undergone considerable alteration, a more close and prolonged inspection may be needed. In all cases of recognition our attention is caught by some group of characters which we regard as distinguishing the thing. The fineness and certainty of the recognition will thus depend on the fineness of our discrimination and assimilation of the sensations involved, and especially of their relations; and, further, on the closeness of our previous analysis of the object, so as to determine what is distinctively characteristic of it. The process is fundamentally the same whether we are recognising an individual object, say a particular house in a street, or classing a thing, say, *e.g.*,

a celandine or other wild flower. Recognition, in which the assisting element of retentiveness is a "tied image," passes gradually into recognition by analogy as illustrated in children's greetings of new animal and other forms by the names of similar familiar ones.

Recognition takes on a specially rapid and semi-conscious form in the case of familiar signs. This is illustrated in the familiar process of reading print. As is well known, we may when reading recognise as correct and rightly interpret a sentence when words are misspelt, and even when some words are wholly omitted (Note B).

Experimental Study of Perception. One way of investigating perception experimentally is by means of "reaction-time experiments". The subject is required to give a signal, or react, by pressing an electric key as soon as he is aware of, or recognises, some presentation, such as a colour, a printed letter or word, and so on. If the moment of stimulation and the moment of reaction are exactly and automatically recorded, the interval between the two represents the subject's "reaction-time" for that particular act of perception. In this way different individuals may be compared as to their reactions to the same stimulus, or the same individual may be tested for apperception of varying degrees of complexity. The more complicated the processes of recognising or distinguishing required, the slower will be the reaction; and the additional time due to each added process will in some sort measure the time of that process. By this method of experiment it has been shown that a familiar word can be read practically as quickly as a single letter.

Another method is that provided by the *tachistoscope*. This is an instrument by means of which a visual object, such as a colour, a word, a figure, can be exposed to the eye for a very short time which is automatically registered. By presenting, say a word, for a period too short for complete recognition, and then repeating the process till it can be read correctly, the act of perception is split up into stages. By this means light is thrown upon the parts

played by apperceptual and purely perceptual elements in different cases and with different individuals. Among other curious results it has been found that as many as two-thirds of the letters of a word may be changed without being noticed. So, for instance, *hallneiuotion* was read as *hallucination*, and nothing wrong was noticed in it.[1]

Early Development of Perceptions.

Characteristics of Children's Perceptions. Our analysis of perception has suggested the way in which our percepts are gradually built up and perfected. In the first weeks of life there is little if any clear perception of outer things. The sense-materials are not yet discriminated, and experience has not yet supplied the means of interpreting these.

It is some time before a child clearly discriminates colours, sounds and the rest, so as to be able to recognise each distinctly when it recurs. A certain amount of repetition seems necessary to this clear discrimination.

Observations have been carried out on the way in which this discriminative ability progresses, but the results are not very definite. Different observers, experimenting on the colour-sense of the child, have obtained very unlike results as to the order in which the several colours are distinguished and recognised. The ability to name colours is very defective even in children of six to seven years, a large percentage being unable to name correctly the four primary colours, red, yellow, green, blue, though practically all can name black and white correctly.[2] There seems to be no constant order in which the colours come to be known, the order varying with individuals; in general the colour-sense appears to be better developed in girls than in boys.[3]

The progress of discriminative attention and recognition

[1] Meumann, *op. cit.*, ii., p. 246. *Cf.* C. S. Myers, *Text-book of Exper. Psychology*, pp. 323, 325, 415, 417.
[2] E. Meumann, *Experimentelle Pädagogik*, i., p. 107.
[3] *Ibid.*, p. 108.

is throughout determined in part by feeling. The child first notes and distinguishes the touches, the tastes, the sounds which he likes best,—for example, the soft touch of pussy's fur, the sweet taste of sugar, the sound of the canary's song; and will consequently recognise these first.

The importance of exercise and training in the discrimination and recognition of sensations is seen in the exceptional development of discriminative and assimilative power reached by those who through want of a sense have had to throw more than the customary amount of mental activity into other regions of sense-experience. This is strikingly illustrated in the preternaturally keen and fine hearing and touching of the blind. The girl Laura Bridgman, who owing to an illness lost nearly all sensibility save that of touch, and was educated solely by the medium of this sense, developed so fine a tactual discrimination that she was able to tell with a fair degree of accuracy a stranger's age by the *feel* of the wrinkles of the face. The still more remarkable case of Helen Keller illustrates the same thing.[1]

Turning to the other side of perception, the integration and interpretation of sense-materials, we find a number of careful observations on its early development. The progress of perceptual capability is judged by that of motor adaptability to different spatial relations. From the work of Preyer and later observers we know that four or five months are needed for learning to direct the eyes with precision [illegible] an object in the side of the field, as also to [illegible] certain Bostond and grasp an object seen. Even animals so familiar [illegible] perception of distance remains so imperfect sparrow, child will try to grasp objects lying beyond his reach. One little boy acquired a distinct visual perception of distance reachable by the hand about the age of six months.

Children's perceptions remain very imperfect during the second half of the first year, and even later. The difference

[1] See her works, *The Story of My Life* and *The World I Live in*.

in look between a flat picture and a solid body seems to be discerned but very slowly. The distances of objects not reachable by the arm are apprehended later than those within its reach. The change in the look of objects as the child is carried about the room impresses him no doubt, but the meaning of these changes only becomes fully apprehended when he begins to walk, and to find out the amounts of locomotive exertion answering respectively to the different appearances of things. It is some years before experience teaches him how to interpret with some accuracy the signs of distance in the case of remote objects. Nevertheless, as we have seen, the more direct kind of spatial perception of less remote objects, based in the case of touch upon limb-movements, and in that of sight upon sensations of accommodation, etc., develops at a comparatively early age to a point of relative perfection.

Much the same is true of the perception of time-relations. The meaning of long periods of time comes to be understood only very gradually. Thus children of eight years have been found not to know how many hours there are in a day, and to give as the number of days in a year answers varying from nineteen to three hundred.[1] Though this kind of time estimation evidently depends upon much besides direct perception, it is practically of great importance to note how meaningless for young children are all terms denoting the longer periods of time. On the other hand the perception of *tempo* and rhythm develops very early. Prof. Meumann has observed [illegible] of fourteen to sixteen months beating time correctly.[2] There seems a fair correctness.[2] colours come to

The case of the apperceptive recognitions; in general objects, however, is different. Here there is no question of reaching even approximate perfection, but development goes on while the mind is capable of development at all—until we reach the state that Prof. James calls "old-fogyism".

[1] Meumann, *op. cit.*, i., p. 115.

[2] *Ibid.*, p. 114. On other aspects of children's perception, see Meumann, *op cit.*, i., pp. 116 ff., and ii., pp. 188 ff.

At about the age of six months a child shows signs of discriminatively recognising his mother, father, and others, and of discerning strange faces as such. During the second half year he will learn to distinguish visually and to recognise a fair number of frequently presented objects, such as his feeding-bottle, his father's watch, pussy, the bird in the cage, and so forth. What objects are first added to the child's perceptual "stock-in-trade" or "vocabulary," if the metaphors are allowed, will, as we have seen, depend upon what in his environment most attracts his attention. Perception, like other forms of mental activity, develops along the lines of special interest.

Methods of Investigating Children's Perceptions: (*a*) *Stocks of Notions.* Various attempts have been made to ascertain what things and in what manner children spontaneously observe. One of these is to determine by experimental methods the nature and extent of young children's perceptual, or better, "apperceptual," vocabularies when they begin to attend school. This inquiry addresses itself directly to their stock of ideas, but indirectly it serves to indicate what things are perceived by children. The main result of these inquiries seems to be that children of six years have such a limited and inexact stock of notions that scarcely any object, however common, can be safely assumed to be known to a class of children. As might be expected, country children are found to know more of natural objects than town children. Yet town surroundings are hardly an excuse for the fact that more than one-half of certain Boston children examined were ignorant of animals so familiar as a sparrow and a sheep. The neglected sparrow, by the way, was said by certain Bradford children to have four legs, and by one bolder child six legs. Another set of investigations by a German, R. Seyffert, brought out the tendency of children to apperceive and name unknown objects by far-fetched analogies, and to bring them by hook or by crook under some familiar head. Another interesting point illustrated by these inquiries is the importance of manipulation, the

objects best known proving to be those which the child handles and uses.[1]

(*b*) *Children's Drawings.* Another mode of approach to the perceptual activities of children is to examine their spontaneous drawings. Here again, however, there is a difficulty in getting at the perceptual significance of what we find, since, as is well known, a child in the early stages of drawing does not aim at giving the appearance of an object, but at enumerating or cataloguing its known features. These rather crude artistic performances are, however, interesting in more ways than one. Thus they illustrate the tendency of the childish mind to see things as islands detached from their surroundings; each part of the human body when it attracts the child's attention being treated by the pencil as an independent thing. Again, the introduction of such details as fingers, toes, buttons and the pipe, rather than parts which we should consider important, suggests how the child is apt to be struck by mobile or detachable things. The tendency to show what is invisible, *e.g.*, the two eyes in a profile drawing, the two legs of a horseman, points to the fact that the child is bent on carrying to an amusing excess the process of discounting the particular aspect of an object presented at the moment so as to get at the permanent reality.[2]

Educational Control of Perception.

What Training of the Senses Means. The training of the senses involves an exercise of the sense-organs, *e.g.*, the eye, in readily directing itself towards and fixing itself on an object. But it is much more than this. We can only be said to train the senses completely when we exer-

[1] For an account of these inquiries see Stanley Hall, *Contents of Children's Minds* (1893), or *Ausgewählte Beiträge zur Kinderpsychologie und Pädagogik*, pp. 76 ff.; and Meumann, *op. cit.*, i., pp. 141 ff.

[2] For a collection of children's drawings see the author's *Studies of Childhood*, chap. x. The most complete collection yet made is to be found in Dr. G.G. Kerschensteiner's *Die Entwickelung der zeichnerischen Begabung.*

cise a child in those *mental processes*, selective attention, discrimination, etc., by which the given sense-material is worked up into clear percepts. In other words the aim of sense-training is the development of good observing powers, that is to say, of a habit of close and accurate inspection of things by means of the senses, and of readiness and certainty in recognising them.

The work of exercising children in the best kind of sense-observation is a much more complex process than it at first looks. In carrying it out we must go far beyond that practical type of perception which suffices for the bare recognition, say, of a spoon or a hat. Not only must more attention be thrown into the process so as to detect the less conspicuous parts of an object, but a process of analysis must be carried out on the perceptions, so that there may be a full, explicit apprehension of the more important qualities of an object, and of the relations of the parts of an object one to another, and especially of those relations which constitute its form.

The training of the senses may be said to fall roughly into two main divisions: (*a*) the methodical exercise of discriminative sensibility so as to make the senses fine or acute, and (*b*) exercises in that more methodical kind of sense-perception which involves the analysis of qualities and relations, and separate acts of attention to these. We may call this last the *observation* of objects, since it resembles the process carried out in scientific observation.

(*a*) **Training in the Discrimination and Assimilation of Sense-Material.** The methodical training of the senses begins with the mastery of sense-material. The special object of this branch is to render the senses quick and exact in distinguishing and identifying the several impressions presented to them. And the importance of this exercise in sense-discrimination depends on the fact, that in proportion as our sense-impressions are clear and distinct, shall we be able to distinguish and know objects accurately when they are present, and afterwards to recall and think about them. The child that confuses its impressions of colour,

of form, and so forth, is pretty certain to imagine and think about objects in a hazy and confused manner. It may be added that an explicit act of discrimination, as in distinguishing two colours, involves a simple act of judgment.[1]

This training in discrimination may be carried out in a less systematic way in the nursery. The infant's surroundings, the toys to be handled, the picture books, even the pictures on the wall, should be chosen with a view to a sufficient variety of sense-material. Since, moreover, the object of training is to develop a clear sense of the differences among things, objects should be brought together in such a way as to present contrasts in juxtaposition. The natural order of sense-development must be followed, the first differences to be brought under a child's notice being broad contrasts, *e.g.*, that of a hard and a soft material, of a blue and a yellow colour, of a high and a low tone, finer distinctions being left for a later stage.

In close connection with this discrimination of impressions of colour and the rest, the child should be exercised in assimilation, that is to say in the recognition of colours, tones, etc. Hence the exercises require, along with variety, a certain amount of repetition of impressions, so that the pupil may readily identify them. It is by looking again and again at the same coloured pattern that the colour impression grows familiar.

As the child's ability to attend grows, the educator may introduce a more systematic procedure which aims at a full and accurate knowledge of the several sense-elements. Thus in training the colour-sense he may proceed by selecting first of all a few bright and striking colours, such as white, red and blue. Each of these must be made familiar by repeated presentations, and its name be learnt. After being presented separately they should be shown in juxtaposition, so that the differences may be clearly

[1] In experiments upon the "threshold of discrimination" it is found that the certainty and consistency of the subject's judgments form a factor independent of the *fineness* of his discrimination. *Cf.* Stern, *op. cit.*, p. 93.

noted. By seeing two colours side by side the individual character of each is made more apparent and the precise amount of difference between them is much better appreciated.

When a few elements have thus been thoroughly learned new ones may be added. In this way the child will not only add to its stock of sense-materials, but will have its former impressions rendered still more definite by a grasp of more numerous and finer relations of difference. Thus, by adding the two colours yellow and orange to red the learner will have a more exact impression of red as different not only from green and blue, but from the more closely related colours (yellow and orange). At the same time the child will be practised in assimilation, in noting, for example, the likeness running through the various reds, and the similarity of red to orange. Such a clear, explicit apprehension of colour relations can only be reached gradually. To classify under one head all the reds or blues, and, what is much more, to appreciate the precise degrees of difference and of similarity between colours, or, in other words, their distances one from the other in the scale of colour, is to go beyond the bare process of sense-perception and to exercise thought processes of comparing and judging of a considerable degree of complexity.

Throughout this branch of training the educator should remember that the finer exercises in discrimination and assimilation imply a special effort of attention, and are apt to be felt as a severe strain by the child. They should not, therefore, be greatly prolonged. If, however, judiciously adapted to young capacities and tastes, they may be made not only tolerable but positively agreeable, as in Froebel's gifts, which teach discrimination by means of an intelligent kind of play. Children love activity, and activity both of body and of mind is enlisted when a child is invited not only to compare colours but to select and to arrange them.

While these exercises in the finer discrimination and assimilation of sense-material are valuable, it is possible

to over-rate their value. This Rousseau seems to have done in his conception of his ideally trained Émile, who should be able to distinguish objects in the dark by the sense of touch with something of the skill of the blind.[1] A child brought up in a civilised community does not need the finer sorts of detection of sense-impressions, *e.g.*, those of sight and hearing, which are useful to savages as well as to many animals.[2]

(*b*) **Training in the Observation of Things.** We may now turn to that fuller process of training which has to do with the finer analytic kind of perception constituting an act of Observation. The aim here is to lead the child on to a full explicit apprehension of the object as a whole, by a clear grasp of its parts, qualities and relations; and this has been shown to involve exercises in rudimentary processes of thought, both analysis and synthesis of the more explicit kind.

Methodical Observation of Form. In order to illustrate this training in explicit observation, we may take what is of greatest importance for knowledge, the *form* of an object. As we have seen, many children, at any rate, have only a very shadowy idea of the form of familiar things, as a spoon or a horse. They do not clearly distinguish the parts of the form or the precise relations among them. So far as they do attend to details which particularly impress them they are apt on this very account to fall into a one-sided, fragmentary way of looking at things, as when a little boy of two called a bronze statue of a stork "gee-gee" (horse), apparently on the ground of its possessing a long neck like the horse. Their drawings as well as their verbal descriptions of what they have seen appear, too, to point to the same conclusion.

The educator must seek to take the child on from this rude implicit mode of apprehending the elements and relations of form to a more exact and explicit apprehension of

[1] See *Émile*, livre ii., p. 128 *sqq.* (edition of Garnier Frères).
[2] Compare W. H. Payne, *Contributions to the Science of Education*, pp. 27, and 81, 82.

form as a group of related parts. Thus, whether dealing with the form of a plant, of a triangle, or of a word, he will aim at securing a well-defined percept by getting his pupils to attend successively to the several details and to the relations of these in the particular whole dealt with. Younger children should of course be encouraged to inspect the forms of things for themselves, both with eye and with hand, and to find out all that they can before being taken on to the more regulated exercises.

The more important principles which govern this early department of training appear to be the following: (1) A complete and perfectly distinct perception of form involves not merely passive sight and touch but motor activity. This assists, as we have seen, in the isolating act of attention to this and that detail. Again, so far as the activity of tracing outlines counts, it presents details in terms of motor experience, and so tends to give greater vividness to the percept. Of chief value in this motor activity is manual constructive work, such as building a bridge with bricks, making a square with sticks, and drawing a man or a duck. Such constructive work owes a part of its educative value to the fact that it translates what is seen (the model form) into a series of muscular movements, each of which issues in the production of a certain form-element. In this way it compels the attention to fix itself both on the several lines and on their relations in a peculiarly close manner, and at the same time presents form under a new and impressive aspect, namely, the mode of producing it.[1]

(2) Exercises in the observation of form should comply with the general laws of mental development. Children's perceptions and ideas pass from an indefinite and incomplete to a definite and complete stage. A teacher dealing with a child must follow this order, leading him first to get a preliminary "general" impression of the form of a horse, or a bird, and then to observe the finer details. In

[1] On the importance of such successive acts of attention as preparing for a clear simultaneous grasp of wholes, see Royce, *Outlines of Psychology*, p. 250; *cf.* also Meumann, *op. cit.*, i., p. 126, and ii., p. 196.

like manner it should begin with what is relatively simple and only later present the more complex kind of form.[1] The kindergarten gifts and occupations, by using simple regular forms, clearly satisfy these conditions in general. Froebel, though given to wild speculations, had some psychological insight, as is seen in his recognition of the important function of touch in the perception of form, and of the connection between this perception and the expression of the idea of form by manual construction.

Exercises in the apprehension and manual reproduction of lines and abstract geometrical forms, such as the square, are apt to seem dry, and need to be supplemented by a training in the observation of concrete forms. Children's drawings, as well as their talk, show us that from an early period they are interesting themselves in the forms of common objects, from animals to railway engines and ships. Here, again, the hand should be called in, in order to reproduce what is seen. The well-known kindergarten occupations, such as clay-modelling, paper-folding and drawing, tend to render the perceptions of form more clear and exact. Of these, Drawing, as an exercise of special educational significance, claims a word or two.

Something has already been said about children's drawing. It is found that a child when in the first cataloguing stage will, when he is induced to copy something before his eyes, achieve less satisfactory results than when drawing from memory or imagination.[2] Nevertheless at this first stage the child will find that some amount of knowledge of the forms of things is necessary in order merely to indicate them, so that even this crude kind of drawing must tend to make him observe more closely. But, further, children's drawing gradually becomes less exclusively "a conceptual writing down of the characteristics of things" and more an imitative representation of them.[3]

[1] The author once listened in a village school to a lesson on a grain of maize, in which the teacher managed fairly to confuse her class by presenting the object and instantly asking what its shape was.

[2] G. Kerschensteiner, *op. cit.*, p. 486.

[3] Kerschensteiner, *op. cit.*, p. 486.

At this later stage it no longer affords so clear an indication of their general knowledge of things,[1] but on the other hand it becomes a most valuable means of *training* the power of observation.

The two sides of the training in the observation and manual reconstruction of form here distinguished should be carried on together, and be made to help one another. The superior interest of concrete forms, especially those of living things, makes it desirable to deal with the simpler of these in the earlier stages. A child will take pleasure in trying to draw a house some time before he is able to give attention to the abstract form-elements, straight lines, etc. Yet, as soon as the power of attending to abstract elements is developed, this last should be required. In drawing a house, for example, a child should be led to note the inclination and length of the lines, the bluntness or sharpness of the angles, and so on. Even in dealing with the forms of living things, simple geometric schemes—as the oval for the body and the oval or triangle for the head of an animal—may with advantage be introduced as at once aiding the execution and giving explicit definiteness to the forms dealt with.[2]

The Principle of the Object-Lesson. We may now pass to exercises in the fuller perceptual apprehension of concrete objects as wholes. The systematic development of this side of observation leads to the Object-lesson. By this is meant, strictly speaking, the presentment to a pupil or class of pupils of some suitable object, such as a piece of chalk or an ear of corn, in such a way as to secure a detailed examination of its main aspects and qualities by the several senses. With this there commonly goes some exhibition of the capabilities and uses of the object, and some reference to its origin and history.

The object-lesson falls naturally into two parts: (1) the

[1] It still indicates their ability to grasp in a single act of perception the form of a thing as a whole. Kerschensteiner, *ibid.*, p. 486, §§ 5, 6.

[2] On the educational principles underlying drawing, the student should consult H. Spencer, *Education*, chap. ii.

detailed exposition and naming of the several parts, qualities and relations of the object; and (2) the summing up of the results in a verbal *description* of the object.

This form of instruction supplies a fit introduction to the study of physical sciences, such as botany. Its value under this aspect will obviously depend on the extent to which the observing powers of the class have been made use of. The mere showing of an object by way of illustrating a lesson does not make it an object-lesson in the full sense of the expression.

An object-lesson, however, is always more than a training in mere observation. It has been shown that the explicit mental grasp of the qualities and relations of an object implies a certain amount of thought-activity. It exercises a child's mind in that work of "abstraction" which will be dealt with later. Not only so, in order to secure a clear mental apprehension of the qualities of an object, the teacher frequently sets it in juxtaposition with other objects, and invites the learners to compare them. This applies with special force to the explicit apprehension of one of *two opposite or contrasting qualities*, *e.g.*, heavy and light, transparent and opaque.

All observation is selection under the guidance of interest, and interest implies, as we have seen, a point of view. Hence the teacher in asking a child to observe must indicate the point of view, or else expect that the child will either not know how to set about his observing, or will observe from a point of view very different from his own. To be asked simply to observe a thing is almost as disconcerting as to be requested to "speak French" with no hint as to what to say. But though the teacher can and must supply the particular point of view, he must recognise that some points of view are much more natural to particular ages of childhood than others.

In this connection attention may be called to some recent researches of Prof. L. W. Stern. He distinguishes four typical observational or apperceptional stages: (1) of *thinghood*, in which a mere list of "things" is given,

e.g., "a man, a woman, a cradle, a bed, etc.". (2) Of *action* (age about eight), where the child notes particularly human actions. (3) Of *relation* (beginning about nine or ten), in which the spatial, temporal and causal relations of the things are noted. (4) Of *quality*, in which things are analysed into their qualities.[1] Two points are particularly noteworthy here: that the stage of quality or analysis is reached latest, and that the first stage consists of a listing of "things" very similar to what we have already seen in children's earliest drawings. An attempt to transcend these limitations, by exercising a child in the observation of relations when he was still at one of the earlier stages, was found to have only a temporary effect.[2]

A more general attempt has also been made by Prof. Meumann[3] to determine by experimental methods whether, and by what means, the power of observation can be improved by training. Various methods were tried. By taking a picture and merely telling the children to observe the details, a negative result was obtained. By telling them to observe according to definite categories, *e.g.*, things, persons, forms, colours, etc., *and* by exercising them also in recognising and naming concrete instances of these categories, an improvement in accuracy of observation was obtained, though in some cases there was a decrease in its amount. The most successful method was found to be that of exhortation. The children's conscientiousness and ambition were appealed to, and the force of Suggestion was called in by assuring them that the task was an easy one.[4] Prof. Meumann concludes that there are three chief methods of training observation (1) exhortation, (2) instruction in the materials of observation (colours, forms,

[1] Meumann, *op. cit.*, i., p. 117, where the reference to Stern is given.

[2] *Ibid.*, p. 119. But compare the descriptions of a picture by children of eight and five and a half years in C. and W. Stern's *Erinnerung, Aussage und Lüge*, etc., chap. viii.

[3] *Op. cit.*, ii., p. 182 ff.

[4] Prof. Jastrow (*Fact and Fable in Psychology*) tells how, in learning to use a new tabulating machine, those clerks who had been led to regard the task as difficult took vastly longer than others who believed it to be easy (quoted by Thorndike, *Child Study*, p. 122).

etc.), (3) introducing method by indicating leading points of view.[1]

It follows that the object-lesson is preparatory to scientific study in more ways than one. It requires something of that analysis of objects, of that separate or abstract consideration of their several qualities and relations, which gives to scientific investigation its clearness and exactness. Again, it includes the beginnings of scientific Classification and Definition. In a good object-lesson, say on a leaf, a step is taken towards a *general conception* of the class "leaf," and a definition of the common structure and function of leaves.

The object-lesson, while aiming primarily and mainly at training in observation, may seek indirectly to develop as an after result clear *ideas* about the object. This is illustrated, indeed, in the final recapitulatory stage of the lesson. The development of clear ideas is more directly aimed at in that illustrative use of objects, such as pictures and raised maps, which enters more or less into all the more concrete branches of teaching. In this case the object shown is not carefully analysed, but viewed from the point of view of the special ideas to be illustrated.

It is very doubtful whether the best class-room teaching can provide an adequate training in observation. Darwin and many another fine observer developed their power in out-of-school observation of nature. A walk in the country or a visit to a museum or a picture gallery with an observant parent, teacher, or friend will probably do more to awaken interest and to excite the mind to close and accurate observation than many school exercises. Excursions into the country or to some museum, etc., are in Germany a recognised part of the school work.[2] The differences in the stock of ideas of town-bred and country-bred children would alone suggest that our schools should

[1] *Op. cit.*, ii., p. 186.

[2] The great influence of home-surroundings and parental teaching on observation is mentioned by Meumann as one of the clearest results of the experimental inquiries into children's stocks of ideas, *op. cit.*, i., p. 157.

set themselves seriously to find some substitute for the agreeable activities, exploring, collecting, etc., by which children when face to face with nature half spontaneously develop the observant eye.

Just as observation can by methodical training be developed into this clear grasp of qualities and relations, so can recognition. In truth, the methodical lesson on one object should be followed up by exercises in an explicit recognition of other similar objects through a clear apprehension of distinguishing marks. The amount of mental activity thrown into the first observation will be tested by the readiness and accuracy of the recognition, and by the ability to single out and name each of the characteristic features of the object recognised. This applies both to the identification of a single object, say a particular fossil, seen before, and to that wider recognition of a member of a class which grows out of observation, say, the recognition of a new specimen of fossil.

NOTES.

NOTE A (p. 160).—The experiments of Stratton, Judd and others show that when movements occur in visual perception, as in tracing the contour of an object, they reproduce the outline only very inexactly (see Meumann, *op. cit.*, ii., p. 200). This suggests that in much of our later seeing movement *at the time* aids but little in the nicer appreciation of spatial form. The facts observed, however, are quite consistent with the hypothesis that movements, both of hand and of eye, have in the past experience of the individual played a vital part in the development of spatial form (see Note A, end of last chapter). The experiments referred to need to be supplemented by other inquiries, so as to determine whether this looser, irregular mode of eye-movement in connection with visual perception is the common one at all ages, and in all mental conditions, including the æsthetic contemplation of form.

NOTE B (p. 177).—**The Psychology of Reading.** This is a large subject, and in the following brief account we shall confine ourselves as much as possible to those aspects of reading which illustrate the perceptual and apperceptive processes dealt with in chapters vii. and viii.

The adult does not attend with a separate effort to each letter but grasps in a single act of attention a whole word or a group of words. Thus, so far from a word of, say, six letters taking as long to read as six separate letters, a

familiar word of moderate length is read almost as quickly as a single separate letter. Further, words which are connected in sentences are read more quickly than the same words when not connected by a thread of meaning.[1]

Other evidence that we do not read letter by letter, or even word by word, is provided by the nature of the movements of the eye in reading, which are not continuous along the line, but form a series of jumps from point to point, varying from one to seven per line.[2] The actual *seeing* is done, not while the eye is moving, but at the stopping points.[3]

The fact that we read words as wholes does not necessarily involve any inaccuracy of observation; the expert can always observe more accurately, as well as more quickly, than the novice. Actually, however, we do not as a rule give ourselves time to grasp the visual aspect of words accurately, so that a word may be read as correct even when more than half its letters are changed. This does not mean that out of ten letters *any* five may be changed and *any* others substituted for them. The word being read as a whole, some letters are much more essential to its general form than others. "In the recognition of words the chief part is played by initial and final letters (Zeitler and Huey), especially capital letters. Next to these come the portions of letters extending above the line, and then the portions of long letters extending below the line; the least important part being played by the portions falling on the line. Further, in general, the upper part of words is more important for recognition than the lower and the left half of words more important than the right."[4] A word's "form as a whole" seems to be essentially its optical rhythm, depending on the way it is subdivided by the long letters extending above or below the line.[5]

The attention in reading is, as we all know, directed primarily to the ideas, that is, the meanings of the words. Thus the nature of the context will in most cases arouse an expectation that a certain more or less definite meaning will follow. This meaning might, indeed, be supplied equally well by several different words, but the rhythmic form of the printed word will suffice to determine which of these possibilities is actually before us. In the same way, if the rhythmic form as apprehended is sufficiently vague to suit several words, the sense required will determine which of these is the right one. Thus the word as read may be said to be selected as being the common factor of two groups, the various meanings admitted by the context, and the various word-forms covered by the rhythmic scheme perceived. Reading is thus doubly an apperceptive process.

But further, there is not merely a double series consisting of visual percepts and images of words on the one hand and ideas of the meaning of the words on the other. For the written word represents immediately, not the meaning, but the word as spoken and heard. The child learns to speak before it learns to read, and the visual symbol is always translated into an auditory-motor one. The visual symbol CAT is a symbol not of the form of a cat, its cry or what not, but of the sound of the spoken word, already firmly associated with the idea of the thing. The process of reading is then a triple one, consisting of (1) the visual perception of the word, (2) the reinstatement of the spoken word, partly by means of auditory-motor images, partly by means of actual move-

[1] Meumann, *op. cit.*, ii., p. 249.
[2] *Ibid.*, p. 239; *cf.* Judd, *Genetic Psychology*, chap. viii.
[3] On the question what, exactly, is done at the pauses, see Meumann, *op. cit.*, ii., p. 241.
[4] *Ibid.*, p. 247.
[5] *Ibid.*

ments of articulation, and (3) the comprehension of the word's meaning (reproduction of the idea of the thing.)[1] The account just given holds good of all normal cases. It needs to be modified, however, in the case of individuals of a markedly visual or other type. For example, in the case of a "visual" the sight of a word may lead directly to the meaning, and the sound be reproduced, if at all, only as a bye-product.[2]

Coming now to children, there are two cases to be considered, that of the beginner and that of the child who has already made some progress.

About the beginner there is little that is positive to be said. He does, as a matter of fact, begin by reading letter by letter, but it is uncertain how far this is due to the methods of teaching usually adopted.[3]

The child who has had some practice soon comes to read words as wholes, and so far approximates to the adult type. The main difference is indeed that the child appears to read even more subjectively than the adult, proffering one wild guess after another if he fails to read the word rightly at first. Thus a child has been observed to make as many as thirty guesses at a word which was given repeated short exposures in the tachistoscope.[4]

In the case of an isolated word there is of course no question of appropriate meaning, but even in continuous reading the child's guessing is not due to attending to the meaning rather than to the visual form of the word, which is one main reason why the adult when reading overlooks misprints and even substitutes one word for another. The child's guesses are often so wide of the mark rather because, while his perception of the visual form is even vaguer and more fragmentary than that of the adult,[5] he subjects the words which occur to him to a far less thorough scrutiny with regard to their suitability both in form and in meaning. More especially, his apperception fails to apply these two tests *together*, so that he is apt to proffer a word suitable in form but unsuitable in meaning, or *vice versâ*. The relative poverty of his vocabulary also makes it less likely that the right word will suggest itself at once.[6]

Teaching of Reading.—Since people began to think about education, many different methods of teaching reading have been advocated. Here, as so often, the only definite agreement seems to be upon the point that the orthodox method (by continual spelling) is the worst possible.

The various methods fall into two main groups, the *analytic* and the *synthetic*. The former consists in making the child read words as wholes from the first, and only later analyse these wholes into their constituent letters. The synthetic methods would begin with the letters and advance to words by a synthesis of these.

The main argument for the analytic methods is that the adult and the practised child quite certainly do actually read words as wholes, and that therefore to teach the child to read letter by letter would seem to be needlessly cultivating a habit that must afterwards be broken through. Thus the analytic method is definitely recommended by Judd[7] and Barth.[8] Meumann, on

[1] Meumann, *op. cit.*, ii., pp. 235, 274 f.
[2] *Ibid.*, pp. 278 f.; *cf.* the account of different reading types, *ibid.*, pp. 250 ff.
[3] Meumann, *op. cit.*, p. 257.
[4] *Ibid.*, p. 255, from Messmer, *Zur Psychologie des Lesen*.
[5] *Ibid.*, p. 255. [6] *Ibid.*
[7] *Genetic Psychology*, p. 251.
[8] *Elemente der Erziehungs- und Unterrichtslehre*, p. 444.

the other hand, urges [1] that the fact that the child tends naturally to read words as wholes, and is far too prone to read by guessing, is an argument in favour of the synthetic method, which enforces close attention to word-elements and so makes for exactness of perception. One difficulty which is felt, whether we try to build up words out of their elements, or, later, to reach the elements by splitting up the words, is that of deciding what are the elements of words. It might seem to be obvious that these are letters, but the matter is not quite as simple as it appears. A "word" as read is both a visual and an auditory-motor complex, and it does not follow that both those complexes admit of being split up into the same components. Thus while letters are evidently the constituent units of words *as seen*, they are far from being the constituent units of words as heard and spoken, the wholes in the latter case being clearly other than a mere aggregation of the letter sounds, even when the proper phonetic value is given to these.[2] The simplest components out of which the word as auditory-motor can be built up, are not letters but syllables.

It would seem advisable, then, to distinguish sharply between learning the letters, *i.e.*, learning to recognise and name them) and reading. There should be a preliminary teaching of the letters by making the child draw them, and distinguish one from the other, using for this purpose their traditional names, but merely as handles.[3] There might also with advantage be a preliminary phonetic training.[4] But reading proper, that is, the interpreting of certain visual forms as symbols of certain spoken sounds which are, in general, themselves known as symbols, should only begin with the syllable. These should, as far as possible, be also words that have a meaning, and the words should be combined in simple sentences. This makes the process more real and interesting. Moreover, in the case of significant words, a second bond of association with the visual symbol can be provided by exhibiting the object described, or a representation of it, together with the word.[5] By beginning with significant words and phrases one gets the advantages of the analytic methods, while the preliminary training in the visual and the phonetic elements, and the fact that one begins with the syllable, out of which longer words have to be built up synthetically, should serve to ensure attention to details. This can further be aided greatly by taking writing in closest connection with reading; the value of reproductive movements (as writing, drawing, etc.) in enforcing exact analytic observation, has been pointed out above (p. 187).

[1] *Op. cit.*, pp. 233, 259, 262.

[2] See the account of the Lautier Methode and the Begriffliche Methode in Meumann, *op. cit.*, ii., pp. 217 ff.

[3] The order of the letters in the alphabet is of course of quite minor importance here; indeed to present the letters in any constant order hinders rather than aids the learning of their individual forms.

[4] *Cf.* Meumann, *op. cit.*, ii., p. 262.

[5] This profits by the child's complicative memory; *cf.* Barth, *loc. cit.*

CHAPTER IX.

MENTAL REPRODUCTION: IMAGES AND THEIR CONNECTIONS. ASSOCIATION.

Revival of Sense-Presentations. The senses are the source of all our knowledge about external things—their several qualities, their local relations, their movements, and so forth. Yet it is evident that if we could only observe objects by way of the senses we should gain no genuine knowledge, for knowledge is something which persists and remains with us.

The persistence of an after-effect, a sort of echo of our sense-presentations, is clearly an illustration of that fundamental property of mind which we call Retentiveness. This, as was pointed out in an earlier chapter, has for its supposed physiological basis the setting up in certain neural paths of fixed lines of easy discharge, which may be called functional dispositions to carry out this particular form of nervous process (see above, p. 68).

As a result of this, the particular process may be aroused in a modified and restricted form when sensory stimuli no longer excite the organs of sense, and as the result of other cerebral processes. The mental accompaniment of such a centrally initiated partial reinstatement of the sensory process is a mental image.[1] The setting up of this independent form of brain activity is strikingly illustrated in the

[1] It is to be noted that the mental reproduction of a percept is more than the revival of a mere sensation, since it involves the synthetic arrangement of material and meaning which, as we have seen, enter into the structure of a percept. The physiological basis of mental reproduction must therefore be a *complex group* of central nervous processes.

case of the blind Milton and the deaf Beethoven, each of whom, in spite of the loss of a sense, developed a rare affluence of the corresponding imagery.

It must be clearly understood that the name retentiveness, when applied to sense-impressions afterwards recalled, is merely a convenient way of describing the fact that memory-images of them are reproducible. Our way of talking about impressions stored away in the mind is highly figurative, and apt to mislead. Our minds are not material objects like boxes, capable of receiving and holding things, which we can afterwards take out. We can only know retention by its after-effects in our conscious processes. Mental reproduction is the most impressive and important form of retention, since it means a kind of revival of a past experience.

Mental Images. When we recall what is no longer present to the senses the process is called Reproductive Imagination and the result an image, the word "image" being here used comprehensively to include recalled sounds, touches, movements, etc., as well as visual impressions. The process is also spoken of as Representation since it re-presents what was before presented; and the resulting image is known as a *representative image*. In recalling the look of our home or of our friend we speak of *seeing* with the "mind's eye" the object we originally saw with the bodily eye. These mental or representative images must be distinguished from *after-images* or *after-sensations*, which we experience when, after looking steadily at a bright object, say a lamp, a window, or a black cross on a white ground, we turn the eyes to some neutral background, say a grey wall.[1]

Our images are as a rule much less complete and distinct than our percepts. In recalling, for example, the face of an old friend we do not ordinarily represent in sharp distinctness all its features. Indeed, the researches of Sir F. Galton as to people's power of "visualising," *i.e.*, calling

[1] For an account of these and other images, from which memory-images have to be distinguished, see Stout, *Manual*, bk. ii., chap. iv., §§ 10, 11.

up distinct and complete mental pictures of familiar objects, go to show that very few of us have the power of fully and distinctly imaging even so well known an object as our breakfast-table, with all its details, including their colours as well as their forms.

The power of forming complete and clear images varies greatly with individuals. More especially it must be noted that though visual imagery is on the whole the commonest, and most of us are predominantly visualisers, some people belong to the auditory or motor types, that is, they form most naturally and easily images of sounds or movements. This is of special importance where verbal material of any kind has to be recalled, since it may always be reproduced by means either of visual images of the printed words, or auditory images of the sounds, or motor images of the movements of articulation.

Further, as regards completeness, the difference between images and percepts is not so great as appears at first sight, since the apparent completeness of the percept is, as we saw in the last chapter, to a large extent illusory. When an incomplete word is exposed in the tachistoscope for a very short time it may be read as if complete, and the subject may feel certain that he saw the whole word. Our percepts *feel* so complete largely because, while the object is still present, they can at any moment or in any respect be *made* complete.[1]

Tied and Free Imagery. We have seen that many of the processes included under perception, in the wide sense, involve the utilisation of previous experiences. These survivals constitute what we called the percept's meaning. If we try to analyse instances of such meaning we find them to be of all degrees of explicitness. At one end of the scale are cases of a vague unanalysable modification or colouring, a feeling that the object is familiar; while at the other end we have such a case as looking at a lemon and *seeing* that it is sour, or groping in a dark room and

[1] For a discussion of the differences between images and percepts see Stout, *Manual*, iv., i., § 4.

visualising the objects touched. In these last cases imagery is clearly involved. In intermediate cases, *e.g.*, when we say the polished marble looks smooth, it may be difficult to say whether we are describing a certain visual appearance, or whether some tactual imagery is involved. Yet in all cases alike the imagery involved in such perceptual meaning is *bound* to the actual presentation and serves only to enlarge or *complicate* it. The smoothness of the marble, whether visual or tactual, affects us only while the marble is before our eyes; it is only as we see the lemon that we realise its sourness; it is at the moment of contact that the picture of the object touched appears to us. Of special interest are those cases in which a percept which commonly occurs as a whole is *interrupted*, as when we see part of what we take to be a chair projecting beyond a screen, or hear the beginning of a familiar air suddenly cut short by the closing of a door. In such cases the tendency to complete the percept by imagery is particularly strong, though, as we can easily see, there is possibility of error. In such "disconcerted preperceptions" the shock of the contrast between the expected and the perceived will tend to direct the attention to the imagery as such, to cause a to-and-fro movement of attention between percept and image in comparing the two, and so to help the image to appear and persist independently of the perceptual complex with which it was bound up. It is with images that have attained to such independence or freedom that we shall be concerned in this chapter.

This region of free independent images answers to an important part of what we commonly call Memory. In acquiring any knowledge, *e.g.*, that of a visual object, of a tune, or of a historical fact, we have to develop representative images of some degree of clearness, and easily revivable; though in a good deal of memory, as we shall see later, but little imagery is needed beyond that of the words in which the knowledge recalled is embodied.

Images and Ideas. Strictly speaking an image is the representation of a percept in the narrowest sense—that

is, sense-material held together in a certain form. We have seen, however, that actually our percepts are almost always apperceptions, with an aura or "fringe" of meaning. Accordingly our images, being the representations of such appercepts or intuitions, will themselves have an aura of meaning of which the image proper forms the nucleus, just as the percept proper was the nucleus of the intuition. Such significant images are known as *ideas*.[1]

In the concrete, then, images may be said always to have more or less meaning, that is to occur as parts of ideas. Consequently the processes of association, reproduction, etc., to be discussed in the present chapter must be understood to apply to the meaning of the images as well as to the images themselves. Nevertheless, since the amount of meaning may vary indefinitely without affecting these processes, we are justified in speaking as though we were dealing with simple imagery, and ignoring for the present its meaning. Moreover, the meaning will often, like the meaning involved in our intuitions, be the result of processes of conceptual thought, belonging to a higher level than that which we are at present discussing.

Conditions of Reproduction. The most general condition of Reproduction is a certain degree of *recency* of the original impression. We readily call up an image of an object presented in the adjacent past, such as that of the appearance and the voice of the person with whom we have just been speaking. After longer intervals of time our sense-presentations are, as a rule, less easily recalled. The longer the interval between the presentation and the representation, the less distinct in general will be the image. The greater part of the scenes and the experiences of our childhood is lost to us.

Coming now to more special conditions, we may say that the ability to represent an object some time after it has been perceived depends on two chief circumstances. In the first place, a sense-presentation must

[1] Stout, *Manual*, iv., i., § 2; *Groundwork*, pp. 104 ff.

attain a certain degree of vigour, or "impressiveness". In the second place, there is needed the presence of something, either a sense-presentation or the corresponding image, to "remind" us of the object or to *suggest* it to our minds.

(*a*) **Vigour of Impression: Attention and Retention.** To begin with (assuming that there has been only a single antecedent perception), a distinct image presupposes a degree of vividness in the original percept. This again will obviously comprise certain physical conditions, such as adequate scale in a drawing, adequate illumination of the object. For a like reason, actual sense-presentations have in general more "impressiveness" than mental images. Other things being equally favourable, a child will recall the appearance of a park or river which he has seen better than one of which he has merely had a verbal description. The favourable effect on memory of repeating words audibly so as to get the reinforcing effect of the sounds, and (one may add) the articulatory movements, is explained by this principle.

The vigour of an impression is, however, determined not merely by these external conditions but by the attitude of the mind which reacts on it. If a boy's mind is preoccupied, even so vigorous a sense-impression as that of a costermonger's cry in the street hard by may fail to develop afterwards a distinct image. Hence we must recognise, as a second and even more important condition of image-formation, the degree of interest excited by the corresponding sense-presentation and the intensity of the reaction of attention. This principle is strikingly illustrated in the effects of strong feeling, whether agreeable or disagreeable. When a boy is feeling deeply, as in listening to an exciting story or in watching a cricket match, he will afterwards remember distinctly. Such intensity of feeling appears to render the perceptions fuller and clearer in their details by securing an exceptionally vivid interest and great intensity of mental concentration.

As has been pointed out (see above, p. 136) we may be

interested in a thing from different points of view. One particular point of view is so important that it deserves separate mention, that, namely, which takes as its aim or object the remembering of the matter in question. In other words the desire or will to remember is a factor of great importance. In the course of some experiments on memory, one subject, a foreigner, failed to understand that he was to *learn* the nonsense-syllables which he was required to read through, and in consequence could not recite them after forty-six readings. On realising what was wanted he was able to recite them after another six readings.[1] Ordinary experience confirms this; our attitude is different in attending to a book, a scene, a tune, etc., according as we do or do not aim at learning it.

Finally, it is to be observed that our minds are not always in an equally favourable state for the "taking on" of new impressions. The probability of the retention of a clear mental image varies directly with the degree of mental or cerebral vigour at the time of the presentation. A well-recuperated condition of the brain, such as is realised after a period of repose, is highly favourable to a "deep" or lasting impression.

Repetition and Retention. The mental image produced may be the result of a single sense-presentation. Yet this only suffices for a lasting retention in cases of thrilling experiences which are not likely to occur in the schoolroom. Since all our experiences tend to become effaced after a time, our images require to be reinvigorated by new or *repeated* presentations of the object. Most of the events of our life, the places we have visited once and hurriedly, the talk of our friends, and so on, are forgotten just because the presentations never recur in a precisely similar form, and so get no support from repetition. Here, then, we arrive at a second main circumstance determining the memory-products of our sense-presentations. Our

[1] Meumann, *op. cit.*, ii., p. 61. Prof. Meumann holds that it makes a difference even whether the subject is aiming at temporary or permanent retention, *op. cit.*, ii., p. 44.

images tend to recur more readily, and to take on more of distinctness and completeness, with the number of repetitions of the experience. Where the repetition of the presentation itself is impossible, the renewed reproduction of it may serve, even though less effectually, to bring about the same result. This is illustrated in the familiar experience of talking over with a friend some adventure in which we have shared. Repeating verses inaudibly serves to prolong the memory of them, though in a less degree than repeating them audibly.

Such repetitions, in order to be effectual, must be sufficiently close together in time, or *frequent*. In learning a new language we may look up in a dictionary an uncommon or rarely occurring word a considerable number of times and yet fail to gain a firm hold on it, just because the repetitions are not frequent enough; whereas if the word is an oft-recurring one a comparatively small number of references to the dictionary will suffice. This effect of frequent repetition, which secures a certain recency of impression, may be likened to that of damming a stream with stones. It is only when we throw in the stones with sufficient rapidity that we can hope to establish a barrier against the effacing current of time. After a sufficient amount of repetition, other circumstances being favourable, the image, like the dam, becomes set.

It may be added that each new repetition of a sense-presentation does not produce the same advantageous effect. Experiments have shown that in memorising verbal material, such as a series of nonsense-syllables, the first repetition effects more than any subsequent one.

These two conditions, interest and repetition, take the place of one another to some extent. The more interesting an impression the fewer the repetitions necessary to get it permanently set. Such an impression is Romeo's voice to Juliet:—

> My ears have not yet drunk a hundred words
> Of that tongue's utterance, yet I know the sound.

occur together, or in immediate succession, will afterwards tend to suggest one another. The word "experiences" is used here in preference to "presentations," since, as we shall see, our feelings and active impulses, as well as our sensations, perceptions, etc., are subject to the law.

As already pointed out, association has its physiological basis. In many cases, at least, we know that the associative connection—*e.g.*, that of the sound and the articulatory movement which enter into the experience of saying "Ah!"—involves the formation of connecting paths, or paths of drainage of nervous energy,[1] by way of the so-called associative fibres in the brain.

This principle of Association is illustrated throughout the process of acquiring knowledge, whether from the direct inspection of things or by way of others' instruction. So universal is its action that almost any illustration seems banal.

The relations between things which are the objective ground of the association of mental elements vary, and these variations may, to some extent, modify the form of the associative process. Thus, as pointed out above, the spatial relation of co-adjacency differs from a purely temporal relation in permitting a to-and-fro movement of attention. Again, in the case of the difference between simultaneity and temporal proximity of two occurrences, such as sounds, some effect in modifying the associative process may occur from the less or greater distinguishability of the sense-presentations thus arising. But, speaking generally, one may say that the associative process is one and the same in all cases.

Associations are sometimes distinguished in other ways. Thus we may mark off not only spatial from temporal contiguity but a pure spatial relation, say that of Tintern Abbey to the Wye, from a mixed spatial and temporal one, *e.g.*, the relation of Shakespeare to Stratford-on-Avon. So, too, we may distinguish a special class of objective

[1] See McDougall, *Primer*, pp. 124 ff.

associations, that is of objects with their qualities, uses, modes of production. Such subdivisions do not, however, amount to a psychological classification. Moreover, even for practical and experimental purposes they are not very satisfactory, since in most cases it is impossible to assign a particular reproduction with certainty to one category only. The same two presentations may have been associated for different reasons at different times.[1]

It is easy to see that all learning, in the teacher's sense of the word, illustrates the same law. Thus in an object-lesson a child has to connect the mode of production of coal or other substance with its uses, and in a lesson in geometry, to connect the figure with the construction to be carried out and the postulates and axioms to be applied. Again, since school-learning proceeds very largely by aid of verbal associations, *e.g.*, in learning the names of things, in memorising rules, formulas in mathematics, poetry and the like, it is apparent that association plays the part of a fundamental principle in the work of instruction.

Learning a foreign language also might seem to be exclusively a matter of verbal association. It must no doubt always be so to a great extent, but the modern "direct" methods of teaching language aim at associating the foreign word directly with the thing it denotes, and not with the corresponding native word at all. It has been found experimentally that not only are objects in general recalled better than their names, but also that an object is recalled more readily than its name when a strange and arbitrary symbol (such as a foreign word) with which it has been associated is used as the means of suggestion.[2]

Associative Cohesion and its Conditions. The use of the word *tendency* implies that the suggestion does not always take place even when a suggestive excitant is present, and that in some cases the revival is much more prompt than in others. We may meet a person we know and yet not

[1] *Cf.* Ebbinghaus, *Grundzüge*, i., p. 668.

[2] Harvey A. Peterson, "Recall of Words, Objects and Movements," *Psych. Rev. Monograph Suppl.*, 1903.

recall his name, or only succeed in doing so after a prolonged effort; whereas in other cases, the reinstatement is certain and rapid, as when a familiar name, "Uncle John," "St. Paul's," calls up the appropriate image. In certain cases, indeed, the revival is so rapid that we are hardly aware of a transition from a suggesting to a suggested element. The chubby rubicund face of "Uncle John" seems to come with the name and to be half embodied in it. We thus see that there are different degrees of associative cohesion among our ideas.

The strength of the associative bond depends in all cases alike on the same circumstances that we found governing the persistence of impressions regarded as single or apart. These are (1) the amount of attention given to the conjoined experiences; and (2) the frequency of their conjoint occurrence.

The first condition may be illustrated by the associations formed by a child who is greatly interested in the appearance of a stranger, and notes at the same time something peculiar in his name, more especially if he sees some *relation* between the name and appearance, for instance if the man is very short and has a very short name. In such a case the look and name seem to become parts of one whole experience, so that the recurrence of either subsequently at once suggests the image of the other. The same thing is seen when, in hearing a lesson in geography or history, children are called on to give special attention to relations of place or time, such as the situation of a town on a particular river, the occurrence of an event in a particular reign. The great importance of a felt relation between the presentations is due partly to the fact that it causes the attention to play backwards and forwards between the two, so that a single co-presentation of them is equivalent to many co-presentations of experiences between which the only felt relation is that of contiguity itself. Moreover, the more completely presentations are grouped as parts of a larger whole the more intimate is the connection between them, and, as we have seen in considering attention and

perception, it is by felt relations between a number of elements that such organic wholes or complex unities are constituted.

In certain cases of exceptional interest a single co-presentation may suffice to produce a firm association. This applies to experiences which include a lively element of feeling, as when a child connects the pain of being burnt with the fire. In ordinary cases, however, a certain amount of the duller influence of repetition is necessary to fix associations. Our enduring knowledge about the varying phases of earth and sky, the locality we live in, our human surroundings, and so forth, involves many co-presentations. The peculiarly close connections already alluded to, as those between words and ideas, are the result of innumerable conjunctions extending throughout life.[1]

Here, again, as in the case of securing a persistent image, we have to remark that much repetition will produce a result when little if any attention is given. Every dweller in London who is troubled with an ear knows how a stupid jingling tune played again and again on a street organ—which, so far from wishing to attend to it, we mentally thrust away from us—manages to get a footing in the brain and to tease us with its subsequent "ringings".[2] The revivals which occur in dreams, etc., and in certain pathological conditions, show that subconscious impressions may persist and become associated. Memory has thus its mechanical basis, and it is an error to try to reduce it to the mere work of attention. The attempt to resolve contiguous association into continuity of interest ignores one whole side—the organic or mechanical side of memory.

At the same time it remains true that all the more intelligent kind of learning involves more than repetition, and

[1] We shall see presently that it is not only the number of repetitions but their *distribution* that is of importance. A hundred consecutive repetitions will not produce the same effect as ten groups of ten repetitions with a considerable interval between the groups.

[2] Of course the susceptibility to distraction in this as in other casesmay be said to imply a tendency, or barely conscious impulse, to attend: even a silly jingle rung out by a wheezy barrel-organ may be said to be "catching".

more than mere juxtaposition of certain elements A, B, etc. While objective contiguity brings the elements to be associated before the mind, it is an intelligent selection by attention of what is thus co-presented which secures the retention of *knowledge*. Thus the intelligent learner notes the temporal, spatial and other relations between A, B and the other elements presented. It is this which leads to the subsequent orderly account of what has been seen or heard, which contrasts with the disorderly mechanical sequences of the garrulous female beloved of satirical novelists.[1]

Trains of Images. All that has been said respecting a pair of presentations and the resulting representations applies also to a whole series. A large number of our ideas are joined together in trains answering to recurring and oft-repeated series of experiences. Our knowledge of a country through which we have travelled, of a tune, of a poem, of such familiar actions as dressing ourselves, or writing, involves such a train of images or ideas answering to the series of presentations, visual, auditory and motor, which constituted the original series of experiences.

The fixing of such a train depends on a definite series of "movements of attention," and a due repetition of the series. Thus in learning a poem by heart we carry on attention from one word to another in due order, and by repeating the required series of movements of attention again and again we are able on hearing the first words instantly to move on to the succeeding words. The effects of many repetitions in these cases is to make the process of reproduction semi-conscious and automatic. A child repeats a very familiar verse like a machine, *i.e.*, with scarcely any attention to the several steps of the process. It is this kind of memorising which has the closest similarity to habit, sharing in its economic advantages. The effect of habit in this case is seen when we try to reverse the order, giving the numerals or, worse still, the notes of a tune backwards.

[1] See, for example, the passage quoted from Jane Austen in James' *Psychology*, p. 261.

Hence to learn a series, such as the alphabet, backwards, as has sometimes been recommended, is largely a waste of time.[1]

It has been found by experiment that in recalling the members of such a verbal or other train, suggestive force is exercised not only by the immediately preceding member of the series, but in a less degree by remote ones also. Thus in saying, "One, two, three, four," the word "four" is suggested not only by "three," but in a less degree by "two," and in a still less degree by "one". Thus we may say that in repeating a verse from memory the first words of the second line are called up by the whole group of words of the first line. It is found further that rhythmic form plays an important part in such memorising. Not only in the case of verses and tunes but of a string of nonsense-syllables rhythmic form comes in to help us, being in the latter case invented by ourselves. In trying to recall a long name we often recapture the rhythmic form with its distribution of stress, etc., before we recall the whole complex of articulate sounds.

Verbal Series. In many of the trains here referred to, the members, and consequently the mode of connection between them, are complex. This can be best illustrated by the case of verbal series. The first step in learning to speak is the linking on of a definite variety of articulatory movement to its appropriate auditory impression, the verbal sound. Later on, when the child learns to read,[2] he will combine with this associated couple the visual symbol, *viz.*, the printed word. Finally, in learning to write, new associations are built up between definite groups of finger, hand or arm movements and the corresponding visual symbols.

With this complexity of the word itself there goes the further complexity of the union of the word as a whole

[1] The experimental investigations upon which this and the following paragraph are based will be dealt with more fully later.

[2] For a fuller discussion of the psychology of reading, see Note B to the preceding chapter.

with its corresponding idea or meaning. Learning to speak, to read, and to write, plainly includes this further connection between word-symbol and meaning.

These complexes of ideas embodied in words are capable of becoming associated in definite series, and it is very largely by the aid of such series that our knowledge of things in their order of time and of place is retained. This applies even to what a child himself observes, for it is by describing in words what he has seen that he gives definite form and durability to his memory-material. And it applies still more evidently to all the knowledge which is gained by way of others' instruction. Here the facts are presented to the learner through the medium of language, which thus naturally comes to be taken up into the whole acquisition; and it is by this definite fixing of ideas in a verbal series that they are firmly held together, and can be readily recalled.

The remembering of such complex series, further examples of which are afforded by shorthand, musical notation, telegraphic signs and so on, has been called " complicative memory," and it is important to determine the relative importance and the mode of interaction of the various simple series which together make up the complex one. As we have seen, different individuals belong to different types as regards the relative effectiveness of the various kinds of imagery, some working predominantly with visual, others with auditory, and others with kinæsthetic images. The importance of the various constituents of a complex associative series will accordingly vary to some extent with the type of the individual. Nevertheless even where one constituent series is markedly predominant, it may in a given case have weak places or gaps, and where the co-ordination between it and the secondary series is so perfect that each can at once be translated into terms of the other, such a gap in the predominant series can be bridged over if a secondary series is intact at that point. Thus in recalling a poem one may use mainly auditory or kinæsthetic imagery, but if one comes to a gap one may sometimes

help oneself out by turning to visual imagery, trying to picture the line or verse as it was presented to the eye.[1]

It is evidently of considerable practical importance, where verbal or other material capable of appealing to different senses has to be learnt, to know whether it should be given in the form of visual, auditory or kinæsthetic presentations. This point has, as we shall see, been investigated experimentally, with special reference to the learning of orthography. The most general result of these investigations seems to be that an intimate co-ordination of visual or auditory with kinæsthetic sensations is the most advantageous form. This is obtained by letting the learner hear or see the words and at the same time write or pronounce them. The value of this method of presentation is partly due to the fact that more than one sense is appealed to, but more especially to the fact that the seeing or hearing is combined with constructive movement (writing or articulating) in that intimate way which is so peculiarly effective in ensuring close analytic observation and consequent retention.[2]

(2) Suggestion by Similarity: Partial Association. From the time of Aristotle to our own day writers have recognised other modes of reproduction besides that due to contiguous association. Of these other principles the most important is that of Similarity. This is illustrated when a present impression calls up a partially similar one in our past experience, for example when a new face or voice recalls a familiar one. The apparent difference between this and contiguous suggestion is that whereas in the latter the suggesting and suggested elements have become related because they occurred at the same time, forming parts of one experience, in the former they are separated in time, and possibly by a whole period of life.

Recent psychology has tended, however, to regard re-

[1] See Offner, *Das Gedächtnis*, pp. 205 ff.

[2] See W. H. Burnham, "The Hygiene and Psychology of Spelling," in *The Pedagogic Seminary*, Dec., 1906; and Meumann, *Exper. Pädagogik*, ii., pp. 315-324.

vival by contiguity and by similarity as closely kindred processes, as different modifications of one fundamental process of reproduction. We have now to ask how the process known as suggestion by similarity is related to contiguous association. We may best begin by a short account of the new theory as commonly set forth.

In the revivals dealt with under Association we were concerned with wholes having some sort of independent existence, such as the image of a house, the idea of a friend. But, as we have seen, with growing intelligence we begin to analyse our concrete sense-presentations, distinguishing, for example, the several features of a face or the several qualities of glass. These elements of experience cannot be thought of alone. Yet though I cannot think of a smile, or of weight, alone, I can think of it as entering now into this, now into that, concrete whole. In this way it can form the starting-point of a reproduction. Thus, if such an element *a* has on some occasion formed part of the experience *abc*, and on another, part of *ade*, it may, when the one whole is experienced again, lead on, by a sort of budding process, as it were, to the reconstruction of the other whole. If we abstract from the nature of the material associated, this association is evidently of the same kind as that already considered; *a* has been connected with *de*, and therefore when it occurs again (in *abc*) *de* is suggested. The difference, then, is not in the association itself but in the material associated. In the one case it is concrete wholes, in the other the more abstract elements of these. Accordingly if, as commonly, we take the two concrete wholes as units, the second type of suggestion seems to be not of units previously connected but of units containing a part in common, or having certain points of similarity. Hence the na mes "partial association" and "suggestion by similarity"

From the purely forma point of view it might seem that the difference of ma rial should be entirely disregarded. In so far as th elements *abc*, etc., are truly abstract, however, there e es an important modification

of the actual process of revival. For since, as we have seen, such abstract elements cannot stand alone, *a*, though it can function independently of *bc* in suggesting *de*, cannot form an independent step in the mental sequence; nor can the revived elements *de*. Accordingly we have, not the sequence *abc*, *a*, *de*, but the sequence *abc*, *ade*. That is, the suggesting element *a persists*, or reappears in the suggested whole. If cherry-blossom suggests snow, the whiteness appears twice, first as a quality of the blossom, then as a quality of the snow.

As an example of the more extreme type of suggestion by similarity we may take the following. The sight of a controversial psychological article once reminded a person of the figure of St. George in Raphael's picture. "The connection between the sight of the psychological essay and the following image of the pictured warrior is, evidently, the polemic attitude of both."[1] Here the connecting link is "a single highly abstract quality;" but in many cases the common element will be less clearly abstract, as where a pair of new shoes reminds one of a hand-organ by virtue of "the inexorable squeak, common to both instruments of torture".[2] Again a whole, such as a face, may suggest another by some definite portion of itself, say a "tip-tilted" nose. But this only means that no hard and fast line can be drawn between the two forms of reproduction.

The new view of suggestion by similarity just set forth presupposes that the link between the suggesting and suggested member is always some identical feature—whether concrete part or abstract element. But this assumption has by no means been satisfactorily established. It is allowed by all that like suggests like, *e.g.*, one face, voice, line of poetry, when we are unable at the moment to put the mental finger on the common element; and there seem to be cases not only of *unanalysed* but of *unanalysable* similarity. Thus, red and orange are more similar than

[1] M. W. Calkins, *Association*, p. 7. [2] *Ibid.*

red and blue, yet we cannot, according to the usual view, split up the sensation of orange into a sensation of red and one of yellow. These facts require us to modify the above identity-theory, and to claim for suggestion by similarity a place of its own in a theory of mental reproduction. It claims this place, too, on the ground that it marks off a particular kind or direction of mental activity. The tendency to pass mentally from one fragment of an experience to another as illustrated in contiguous association, and the tendency to pass away altogether from one experience to another resembling it, are characteristic of two types of mind, that which dwells on details and searches for accompaniments, and that which seeks the subtle affinities of things whether in scientific discovery or in poetic imagination.

Suggestion of Comparables: Apperceptive Association. The chief instrument of thought is, as we shall see later, comparison. When two presentations or experiences having well-marked points of likeness or contrast are brought before the mind together or in immediate succession, and the relation between them is noted, one result of such an apprehension of likeness or contrast is a strong association of the two experiences.

The association in this case may be said to be due to the apprehension of the likeness or the contrast, so that it might seem fitting to speak of it as an instance of suggestion by similarity or contrast. It must be noted, however, that the suggestion of one of the resembling or contrasting couple by the other in this case is primarily due to the circumstance that the two have been previously attended to together. So far, the association is simply a particular case of the ordinary type of association (by contiguity), similarity (or contrast) entering in only as the relation in which we were interested when we attended to the two experiences together originally.

It should be noted, further, that the two may in the first instance have been brought into mental proximity in one of a great number of ways. One may have suggested

the other (by contiguity or similarity), or they may have been brought together by the environment, including the intentional action of other people, as when a teacher sets before a class two objects in juxtaposition for purposes of comparison. Yet even where there has already been a bond of connection, the new association arising from the comparison is distinct from, and additional to, this.

While we have endeavoured to distinguish reproduction by virtue of an association ensuing upon the apprehension of likeness or contrast from reproduction by similarity, it is highly important to note that this latter is often involved *as well* in the reproduction of comparables. This will indeed tend to be the case whenever the relation apprehended includes similarity of the kind reducible to partial identity: since in this case the apprehension of the similarity will, by bringing out the common features, facilitate reproduction by similarity. And in practice some amount of partial identity will be involved in the great majority of cases of comparability, even where this seems to consist in contrast rather than likeness; for contrast will in general mean unlikeness in certain respects standing out upon a background of general agreement.

For these reasons alone the concrete associative connection resulting from comparison and apprehension of likeness and contrast would be the strongest of all forms of association. But it has a further prerogative in the circumstance that the apprehension of a "striking" similarity or contrast is attended with a feeling of pleasant excitement, a kind of little emotional thrill which quickens the interest and intensifies the attention. Suddenly to discover a likeness against a background of difference is to have a modest sip of the joy of a Newton or a Darwin, on whose mind flashes some new far-reaching similarity in nature's operations. Even a child expresses something of this pleasure when assimilating, say, a fern to a bunch of feathers. Every teacher knows the magical influence of a new glimpse of similarity in natural objects, words, etc. in fixing the related ideas in the pupil's mind.

It may be added that the easy apprehension of similarity in new presentations to old ones greatly economises the labour of committing things to memory. When a boy or a girl comes to study a new language the similarities between its word-forms and those of the mother-tongue save him many a weary turning over of leaves. When the French *café* is seen as having a strong family likeness to *coffee*, or the German *Hund* to *hound*, its meaning is at once made clear, flashed on to it, so to speak, and as a consequence is firmly fixed without the need of the repetitions required for contiguous association. The new acquisition is permanently retained by becoming attached, by a bond of similarity, to a pre-existing group of acquisitions.

Contrast is a much less frequent ground of reproduction than similarity. We cannot say that ideas *in general* tend to suggest contrasting ones as we can say that they tend to suggest similar ones. The familiar contrasts, such as black-white, loud-soft, rich-poor, etc., have their psychological origin in the great function of discrimination in cognition. Logic tells us that the knowledge of opposites is one, and the familiar contrasts just sampled show us that psychologically, too, we know one clearly only by knowing its contrast at the same time. Every teacher knows how a child's idea of straight line, of opacity, and the rest, only grows clear through the mental act of contrasting the property in question with its opposite. Further, to note a contrast in similar things is to feel a pleasant excitement which by quickening the attention adds to the vigour of the contrast itself in producing a lasting impression. Owing to these influences, many connections are formed in early life between contrasting words, more especially adjectives, such as "black-white," "tall-short".[1]

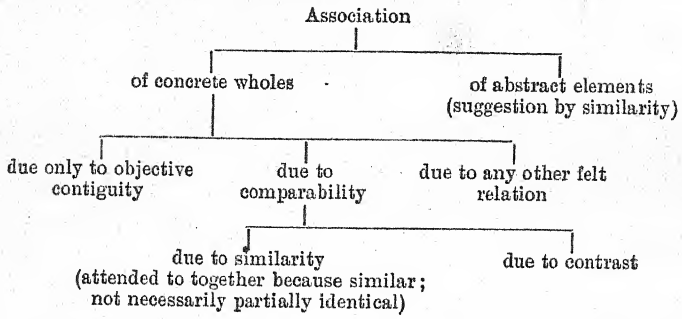
[1] It has been shown by experiments on the mental reproduction of children that the connection between an adjective and its opposite is firmer than that between substantive and substantive or substantive and attributive adjective (see Meumann, *op. cit.*, i., p. 255).

Association and Apperception. The processes described in the last section, where the suggestive and the suggested element are mentally confronted and brought into some definite relation to one another, constitute a process of apperception. The ideas thus confronted and related will, as we have seen, have been brought together by the suggestive force of similarity. Nevertheless, suggestion by similarity by no means necessarily leads to an apprehension of similarity; the psychological essay may suggest St. George without our recognising that both are polemic, and indeed without our bringing the two into any relation at all. The suggestion as such leads on from one to the other and involves no confronting or interaction of the two.

Thus suggestion by similarity, though likely to lead to apperception, is not itself apperception. One of the *results* of apperception will be what we have called association of comparables. But the apperception itself includes, not merely these first and last stages, but all that goes between them, namely, the confronting and relating of new and old and their mutual modification.

To take an instance. A London-bred child sees snow falling for the first time in his life. This reminds him, by similarity, of something else which is wont to fall just as softly through his atmosphere. But he does not simply pass on from the new phenomenon to the old, but comes back from the old to the new, considers them together, makes explicit the difference between them, brings the new under the head of the old to their mutual profit, and declares the result: "Look at the white smuts!" This is the type of childish apperception emphasised by Lange and other Herbartians.

The following scheme may perhaps help to indicate the mutual relations of the various forms of association discussed:—



Simple and Complex Association. So far it has been assumed that the connective lines which suggestion follows are simple, that the suggestive force of a given presentation acts in one single direction only, *viz.*, the revival of a particular memory-image. But this does not correspond with the facts. Suggestion is commonly a complex process. One and the same experience may enter by associative attachment into a number of distinct combinations. Thus the name "Rome" is associated in my mind with pleasant days passed at Rome, with historical events, with the Papacy, and so forth. In addition to such mental networks, due to associations of one whole with others, we have the threads introduced by partial association (suggestion by similarity). Thus the idea of the Colosseum tends to call up those of other similar buildings, *e.g.*, the amphitheatre at Verona, as well as those of adjacent modern buildings. The pathways of suggestive revival are not distinct and parallel, like the strings of a harp, but intersect one another, forming an intricate network.

Obstructive Association. Looked at with reference to the chances of revival of a particular impression, this complexity of connections between the parts of our knowledge is an obstruction to the revival of ideas. If the name "Colosseum" tends to call up a diversity of images, then the mind in setting out from this name is less likely to follow any particular path of suggestion, *e.g.*, that leading to the

recall of the emperor who built it, than if this had been the only associative path leading from it. This may be called the effect of *Obstructive* or *Divergent* Association. The multiplicity of paths is here a hindrance. The errors of confusion into which children are apt to fall when, in repeating a poem, singing a tune from memory, and so forth, they go off on a wrong mental track, are due to the fact that certain members of the series they are recalling, *e.g.*, phrases of the poem or of the tune, enter into other combinations, and so lead their minds astray. A teacher sends me as an example the following. Two stanzas of Tennyson's poem *The Revenge* begin respectively with these lines :—

(1) "And the sun went down, and the stars came out," etc.
(2) "And the night went down, and the sun smiled out," etc.

The similarity here—which is of course (along with the contrast) a strikingly beautiful feature—led a child to confuse the stanzas by substituting for the correct line the similar one, and passing on to the context of this last.

Where a particular name has a great number of associations, none of which has a marked advantage over the others in point of strength, there may even occur a kind of deadlock, each inhibiting the others, and so for some moments nothing may be reproduced. This aspect of obstructive association has been marked off as *reproductive obstruction*, to distinguish it from *associative obstruction*, which consists in the resistance offered by an existing association *a-b* to the *formation* of new associations *ac-*, *a-d*, etc.[1] The latter is illustrated in the familiar difficulty of learning anything correctly if it has once been learnt wrongly. In reciting a poem or playing a tune we are apt to make the same mistake time after time. It is much easier to avoid mistakes in the first instance than to unlearn them when once made. The desirability of avoiding misleading associations is, as Prof. Ebbinghaus points out, a most important consideration in deciding

[1] Ebbinghaus, *Grundzüge*, pp. 660, 661.

between the various methods of committing to memory, and in determining how far it is advisable to let a child puzzle out a new problem for himself.

Co-operative Association. Viewed in another way, this multiplicity of connections between one idea and other ideas is a great aid to the recovery of any one of these that we are in search of. Where a number of mental elements are each fitted to suggest one and the same image, they may co-operate and strengthen the probability of a revival. This may be called the effect of *co-operative* association. When in Rome the ruins, the busts, and the books one reads, co-operate in calling up the images of Augustus, Nero, and the rest.

This aid from co-operative association is seen in recalling those complex series already dealt with, and especially the series of verbal ideas, as they have been called. In repeating a poem, for example, a child is aided by the suggestive force of the words already uttered (both as sounds and as articulatory movements) and also by that of the ideas attached to these.

In this co-operative action of suggestion similarity commonly aids contiguity. A person's name may be recalled not only by calling up his appearance, the tones of his voice, or other associated impression, but also by way of some other name which it resembles, in length, distribution of accent, and in the presence of one or more common sounds, more particularly if this happens to be the initial one. The reproduction of the order of succession of our Saxon kings may be aided by the similarity of their names, just as the learning of the verses of a poem may be aided by the recurring similarities of metre and rhyme.

Associative Groups. It was said above that the pathways formed by association may be compared rather with a network than with a continuous line, or a number of parallel lines. We must now qualify this statement still further by pointing out that the network is not a new, regular and symmetrical one, but an old one, with rents, in places held together by a single strand, in others woven

into dense patches slashed across and across like a bachelor's darn. For the associative network is woven by our attention as it wanders from thing to thing and topic to topic in everyday experience. And such movements of the attention are controlled, as we have seen, by unifying interests. To-day the child's playing with its bricks is followed by dinner; but to-morrow dinner-time comes first and bricks, say, after tea. Thus there will be a repetition of the essential features of dinner—the struggle with implements, the exciting speculations about the pudding, and so on—and a fresh associative interlacing of these dinner-hour experiences. The same will happen to the box-of-bricks group of experiences. The bond between the two groups, however, will be weakened instead of being strengthened. Thus there arise two "clumps" of ideas, each tending to grow more coherent and independent.

This grouping reflects itself in the course taken by our reproductions. It has been found by experiment that if the subject is required to give a list of the ideas called up by a given presentation, such as a word, there is a tendency for the series to assume the form, not of "a necklace of beads equal in size and placed at equal distances," but of groups or "themes" of more or less internal coherence, and separated from one another by well-marked breaks of continuity or changes of direction.[1] A "theme" once started, its principal constituent ideas tend to come up to the exclusion of others, until they are exhausted, or some new stimulus suggests a new line.

To say that the theme works itself out to the exclusion of other lines of suggestion implies that the constituents of the group take part collectively in the suggestion. That is to say, ideas belonging to the group come up to the exclusion of others because they are favoured, not merely by the suggestive force of the preceding idea—which in itself might arouse any of a number of ideas—but by the co-operative suggestion of the other members of the

[1] A. Binet, *L'Étude Experimentale de l'Intelligence*, pp. 63, 64.

group also, though these need not be explicitly before the mind.

Thus, after a few days in France a word may suggest its correct gender, though it would not have done so in England, and though this particular word may not have been met with since our arrival.

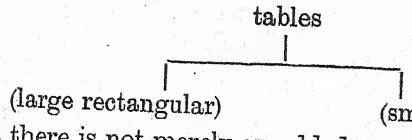
Again a word which occurs in two languages but with different meanings tends to be given the meaning appropriate to the language dominant at the time; for instance *genial* met with in a German book suggests the meaning "of genius," not that which it ordinarily has in English.

Apperceptive Systems. In discussing associative groups in the last section, we spoke as though their coherence were due solely to the greater relative number and strength of mutual association between their members. Such connections are sufficient to constitute an associative group, but there may be, and commonly is, further some amount of system or organisation. That is, the ideas do not form a mere horde, but a system in which each has its place, its definitely realised relations to the whole and to the other parts.[1] Such a system can evidently be built up not by adding one idea to another, but only by confronting one with another and bringing them into some definite relation to one another, binding them together by the help of a form; in a word, by a process of apperception. For this reason, and because it can take part as a whole in further processes of apperception, such a system is called an Apperceptive System.

An instance which has been given as typical is the following. A young child has learnt the word "table". But as the tables of his experience have been large and rectangular, table means for him, *inter alia*, large and rectangular. If now he hears the word applied to a small round object, there ensues a conflict which is resolved only by modification of the new and the old and a system-

[1] Stout, *Analytic Psychology*, ii., pp. 115, 116; the advanced student should read the whole chapter.

atising or grouping of them with reference to the conflicting aspects. The process may be roughly represented thus: tables (large rectangular) × small round (table) =



Thus there is not merely an added association of the word "table" with new objects, but the introduction of system.

From what has been said it will, perhaps, be clear that an apperceptive system must be an associative group, though the converse of this is not true. That is, theoretically, the associative group is the genus of which the apperceptive group is a species. Nevertheless in the concrete we can hardly find an instance of an associative group without any apperceptive systematising; we can only find one approximating to this. Such an instance is that given above of the gender which we are able to recall because of the increased freshness of the language-group as a whole. Here there is a minimum of system because the particular gender may be regarded as an arbitrary fact without logical or other relations to the other facts of the language, so that its alteration would not involve any corresponding alteration in them. In most cases, however, some amount of system will be discoverable, if it be no more than temporal rhythm as in a tune. It will thus be seen that the apperceptive system is related to the associative group much as the appercept (or intuition) to the percept, or as the idea to the image.

A methodical lesson in any branch of knowledge illustrates the action of such an apperceptive system on the reproductive processes of the time, and the modification of the system by the assimilation of new cognitive elements. In a lesson on geometry, for example, the boy's rudimentary geometric system is active from the first: the new figure, the new problem tends to excite those parts of the system, definitions, postulates, axioms and conclusions already ar-

rived at, which seem to bear on them. In this way the reproductive processes are restricted in adaptation to the special requirements of the lesson, while reciprocally the new facts reached add to the system, carrying it a step farther in organisation, and enlarging its scope.

Active Reproduction: Recollection. The reproduction of impressions is very often, comparatively speaking, a passive or mechanical operation, in which there is no control of the successive stages by voluntary attention. In many of our idle moments, *e.g.*, when taking a walk in the country, the mind abandons itself, so to say, to the play of the forces of suggestion. A like facile semi-conscious mode of revival takes place where what has been learned comes back almost automatically as the result of repetition and habit.

In contrast to this passive process of reproduction, there is an active process in which the will co-operates. This is the mode of reproduction with which the teacher is most concerned. In this case, too, the order of the images which arise is ultimately determined by the forces of suggestion, restricted more or less by the influence of a mental system. We cannot by a mere effort, however great, secure the revival of an idea except through the medium of these suggestive agencies. A child cannot recall yesterday's lesson simply by trying to do so unless it has previously been properly learnt and connected with other knowledge. As Plato says, the process of recalling—when the knowledge does not come back at once—is like a recapturing of pigeons which the huntsman put into a cage when he captured them, a kind of second chase after the first one when the knowledge was acquired.[1] That is to say, it must be recovered in a methodical, artful way. This active, methodical way of recovering what we have learnt is best marked off as Recollection.

The nature of the volitional process will have to be considered later on. Here it is enough to say that the

[1] *Theætetus*, p. 197.

effort spoken of consists in a specially strenuous act of concentration on what is before the mind, and points in the direction of the required idea with a view to give it greater distinctness and greater persistence. Thus if a child is asked the date of a certain battle, he may by a special effort fix his attention on the image or idea of the battle (or, as perhaps more frequently happens, on the image of the page in the history book), and thereby develop it into a steady and clear representation. By so doing he helps to bring out the full suggestive force of this idea. Not only so, the will accomplishes an important work in resisting obstructive suggestions by turning the attention away from all misleading reminders, in keeping it within the limits of the group of ideas, and perseveringly following up the useful clues which present themselves.

This active search implies that we are dimly aware beforehand of the *kind* of idea we desire to call up clearly, that our attention can fix itself on what is vague and subconscious, just as it can direct itself to a visual object which lies undefined in the periphery of the field. As we all know, we may try to recall apparently with no result, and only later, when the effort has ceased, find that our "pegging away" has somehow set going brain-processes which, by stirring certain "psycho-physical tendencies," issue in the emergence of the desired idea.

It is to be borne in mind that some amount of the steadying action of the will enters into our ordinary semi-mechanical processes of reproduction. Even in repeating a well-learnt poem a child's will, by an effort so slight that he may be scarcely aware of it, controls the whole process, securing the due succession of the several members of the train, and the avoidance of misleading suggestions. And a complete relaxation of this attitude of attention at any moment would be fatal to the due carrying out of the operation.

Ability to control the reproductive processes reaches its highest form in a habit of going over the contents of memory, and following out, now one line of suggestion, now another, according to the purpose in hand. It is this

ability which is illustrated in the readiness of an intelligent child to answer the teacher's questions, to hark back to the intellectual attachments of a piece of knowledge, to find examples of a rule, analogies to a historical event, and so forth.

Such ready command of the mind's store of knowledge by the will presupposes that there has been an orderly arrangement of the materials, that new facts when learnt have been taken up as ideas into *mental systems.* It is only when there has been in the earlier or acquisitive stage of knowledge a close concentration of attention, and an orderly synthesis of materials into organic systems, that there can be a ready command of the mind's materials in the later stage of reproduction.

CHAPTER X.

MENTAL REPRODUCTION (*continued*): MEMORY.

Mental Reproduction and Memory. In the last chapter we examined the abstract processes of reproduction and association. We have now to consider these from a more practical point of view as they enter into concrete processes of remembering. *Memory*, as popularly used, is the name of a faculty, that is, it is applied to the reviving of a past experience of any kind without reference to the nature of the experience or the exact processes by which it is revived. From this practical point of view the result —the revival—is the only interesting thing, the method is of no consequence: just as in a go-as-you-please cross-country race, the important thing is to get there first, the route taken being the competitor's own affair, and not affecting the judge's decision. The psychologist is interested mainly in the exact processes gone through, or, to continue the metaphor, in the route taken, whether along roads and level ground or over hedges and ditches.

The teacher combines both points of view: he is interested primarily in results, but to aid his pupils to the best results he must know the possible routes and the strong or weak points of his pupils, so as to help them to decide whether they should take the short rough route or the longer level one.

As we have already seen, in mental reproduction there is often a choice of different kinds of imagery, visual, auditory or motor. But we are not confined to imagery. We have, on the one hand, to include material from a higher intellectual level than images—namely, the con-

ceptual elements of ideas: and on the other hand material of a lower level, namely, sensations and movements. Memory at this lower level—which has been called *motor habit*—is illustrated in all fully acquired motor series, such as swimming, cycling, etc. Here each movement is started not by an image or idea but by the actual sensation due to the previous movement. Thus, though able to cycle, we may be unable to carry out the movements in idea so as to tell a beginner whether to turn in the direction in which he is falling or in the other. This motor habit constitutes a large part of *verbal memory*.

Thus, included under the head "memory" we have the various "routes": (1) motor habit; (2) reproductive imagination, itself subdivided into (*a*) visual, (*b*) auditory and (*c*) kinæsthetic imaging; (3) conceptual reproduction. In most concrete acts of remembering all these processes will take part, but in varying proportions. In view of these different constituent processes some writers prefer to speak of *memories* rather than *memory*.[1] Since these constituent processes usually combine in various ways, and different subjects require or favour one combination rather than another, we get such differences as a historical memory, an arithmetical memory, a linguistic memory; in fact, an indefinite number of "memories," varying independently in the same individual.

Reproduction and Reminiscence. Not only does memory include more than reproductive imagination, but according to some authorities it includes more than simple reproduction, namely, "the additional consciousness that we have thought or experienced [the fact or event] before".[2] It is perhaps best to use *memory* in as wide a sense as possible, and to mark off this reproduction with recognition as *reminiscence*. In any case it is important to note that there may be recognition without reproduction, and

[1] The reduction of memory to a group of special memories has been worked out on a physiological basis by Ribot in his little volume, *Diseases of Memory*, chap. iii. (*cf.* below, chap. xx.).

[2] James, *Psychology*, p. 287.

conversely. Thus, as we shall see, the young child begins to recognise objects as familiar before it gives evidence of being capable of mental reproduction. In later life, too, it occurs extremely often that we can recognise a tune, a person, a name, when faced with the reality, but cannot revive it mentally when it is no longer presented. Two instances of reproduction without recognition are the following. Helen Keller relates [1] that at the age of twelve she wrote a story purporting to be original which afterwards turned out to be the reproduction of one that had been read to her four years previously, though she herself was quite unable to remember that she had heard it before. All through her life she has found it difficult to distinguish what is original and what has been told her. Another case is the example of seeing a cloud sail across the window, given in chapter vii. of this work as an illustration of simple perception. The writer supposed that this was entirely his own, but a few weeks later was pained to discover exactly the same illustration in Prof. Ebbinghaus' *Grundzüge*. Even then he was quite unable to remember having read this passage, though in all probability the case was one of reproduction without recognition.

Simple Recognition and Dating. The recognition involved in reminiscence takes two forms. On the one hand, there may be merely a direct feeling of familiarity, of *knowness*, without any recall of the circumstances of the previous experience: and, on the other hand, there may be a definite "dating" of the past experience with reference to other experiences recognised as belonging to one's own past.[2] An example of this would be the recall of a proposition of Euclid, without any recollection of the circumstances and date of the occasion (or occasions) on which it was learnt. In this case there is still recognition, since we are not in doubt as to the experience being a memory. Where there is the second also we have *personal memory*, as when the name of a friend recalls

[1] *Story of My Life*, pt. i., chap. xiv.
[2] Stout calls this "impersonal memory". See *Manual*, p. 454

the whole concrete situation or "setting" in which we last saw him, and this appears as occupying a definite temporal position in our previous history or in the *memory continuum*, as it has been called.

The most plausible explanation of these forms of recognition seems to be that the first is based on a direct feeling of familiarity due to the ease and swiftness—the automatic nature, as it were—of the reinstatement, while the second is due to the associative revival, partial or complete, of the various attendant circumstances, preceding and succeeding events, etc.

It should be observed that the second implies the first kind, since the revived "setting" must itself have the quality of knownness or feeling of familiarity. On the other hand, we are much more likely to recognise an experience when the nature of the case is favourable to the revival of a setting than when we have to trust to direct or simple recognition. Thus experiences which are constantly occurring but in varying contexts, such as the sight of current coins, tend to lose their feeling of familiarity, though of course there is no feeling of novelty.[1] Again, failure to recognise an experience is especially liable to occur—as in the two examples, Helen Keller's story, and the writer's illustration, given above—in the case of ideas rather than of percepts; or where, if the original experience was perceptual, the life of the senses is so restricted as to provide a scanty accompaniment of other sensations.

Early Development of Memory.

Early Growth of Memory. The beginnings of what we call a memory presuppose a certain development of sense-perception. The inability of the infant mind to keep up an image even for a very short interval after the occurrence of an impression is illustrated in the fact that after examining a biscuit tin and finding nothing in it an infant will immediately put its hand in again, apparently losing

[1] M. Offner, *Das Gedächtnis*, p. 112.

all trace of its previous experience. On the other hand, children, even in this early period, clearly display the lower form of retentiveness, *viz.*, that involved in recognising objects. Towards the end of the fourth month a child will show pretty clearly that he recognises familiar objects, *e.g.*, his father. A certain development of this process of recognising objects is necessary before there can be images, in the complete sense of this term, that is, free ideas wholly detached from perceptions.

The first images to be recalled are such as are closely associated with, and so immediately called up by, the impressions of the moment. A child reveals the beginnings of a true reproductive imagination in the attitude of *expectation*, as when he shows that he understands the preparations going on for the meal, the bath and the like. A child of three months showed, according to Perez, the germ of mental reproduction when, happening to see the cage without the bird that he was accustomed to see and hear in it, he manifested all the signs of bitter disappointment.[1] Darwin and others date the first appearance of images or ideas at the age of five months. Darwin tells us that at this age, his child, as soon as his hat and cloak had been put on, became very cross if not taken out at once.[2]

The Developing Texture of Memory. As experiences repeat themselves, the mental images become more distinct, and are more firmly associated. The learning of the meaning of words, which may begin early in the second half year, *i.e.*, several months before the actual employment of them, greatly enlarges the range of suggestion. For example, Darwin's boy at the age of seven months would turn and look at his nurse when her name was pronounced. After the meaning of verbal signs begins to be understood the mother or the nurse may help to suggest the image of an absent object, as by saying "papa" or "bow-wow". The regular recurrence of complex series of experiences brings about the forma-

[1] See his volume *The First Three Years of Childhood*, p. 147.
[2] See his "Biographical Sketch of an Infant," *Mind*, 1877, p. 290.

tion of correspondingly complex series of representations. Thus a child of eighteen months will mentally rehearse a whole series of experiences, *e.g.*, those of a walk: "Go tata, see gee-gee, bow-wow," etc.

It may be added that suggestion by contiguity (total association) appears distinctly to precede that by way of similarity (partial association). The latter grows out of the first "automatic" or assimilative kind of recognition. In one instance it was first observed in the fortieth week.[1]

The child's experience is, however, far from being a mere series of repetitions. The world is new, and full of wonder for the little observer, and his attention is ever being drawn hither and thither to some fresh marvel, and so the store of memory-images is increased. Interests, too, begin to widen out: the germ of an interest in self and its concerns leads the child to observe and to remember how a particular person behaves towards him; and a nascent interest in "pussy" may favour attention to, and so the subsequent recalling of, any new performance of his favourite.

At first, events, even when noted, appear to leave but a temporary impression on the mind. Yet at an early age a child displays the germ of a more lasting retention. One child twelve months old is said to have recognised his nurse after six days' absence, though this, according to Preyer, is a rare occurrence. It is, however, only later that experiences appear to become firmly woven into something like a memory-texture, so that a child is able to recall an incident months afterwards, and with its proper concomitants. A child of two or two and a half sometimes displays a surprising power of recalling little incidents some time after they have happened. Towards the end of the third year—that is to say when he seems to reach a clearer consciousness of self—this increased span of retention appears much more clearly.[2]

[1] K. C. Moore, *Mental Development of a Child*, p. 93.

[2] A survey of the observations of different authors upon the development of memory in young children is given by C. and W. Stern, *Erinnerung, Aus-*

The earlier experience and knowledge tends to some extent to get buried under the superincumbent mass of the later. A child, when at school, will have forgotten much of his baby experiences, his nursery rhymes and so forth. More especially "at puberty there is a marked and characteristic obliteration of infantile memories, which lapse to oblivion with augmented absorption in the present".[1] It is only so far as new impressions become firmly connected with older ones that these last tend to persist. That many, at least, of these earlier impressions are merely borne down by newer impressions is seen in the fact that towards old age, when the power of acquiring new impressions is impaired, the memories of early life often revive with considerable fulness and vividness.

Later Development of Memory. As to the facts of the early development of memory there is no doubt, but when we consider its development from the school age onwards the case is different. Some have held that the years from six to ten are probably "the age of the maximum of pure memory, as typified by language acquisitions".[2] Others have said that memory improves steadily all through childhood and youth and reaches its maximum in adult life, beginning to decline again only in old age. Common observation seems to give equally contradictory results. On the one hand, children show great powers of memory with regard to stories, the ritual of games and so on. Thus, for example, a girl of twelve, after hearing a longish comic poem, could recite it twenty-four hours later almost word for word.[3] On the other hand, the adult is greatly superior at "getting up" some intrinsically uninteresting subject-matter for an examination, in preparing a brief or a lesson, and so on.

In order to solve the puzzle, we must distinguish between acquiring or learning, and retaining. Since both

sage, und Lüge in der ersten Kindheit. Compare Meumann, *op. cit.*, i., pp. 172 ff., and i., pp. 192 ff.

[1] G. Stanley Hall, *Youth*, p. 274.

[2] Bain, *Education as a Science*, p. 186.

[3] K. Groos, *Das Seelenleben des Kindes*, p. 122.

these factors are involved we have again a case such as we compared above to a steeplechase. The kind of material which puts a greater strain on one factor will favour the competitor in whom that factor is relatively strong. Thus, in learning nonsense syllables, the adult requires much less time and fewer repetitions than the child.[1] Again, from eighteen to twenty years about one and a half times as many syllables or words can be immediately reproduced as from eight to ten years".[2] On the other hand, with relatively interesting material, such as a story, it has been found that children in the upper grades of the Elementary School and lower grades of the High School are superior to University students; the maximum amount being remembered by the Second Grade of the High School, namely, 43 per cent. by boys and 47 per cent. by girls, as against 39·5 per cent. by the University students.[3] This suggests that the adult's superiority is rather in learning, and more especially in giving voluntary attention, than in retaining. This has received direct experimental confirmation. It was found that though elementary school children required many more repetitions than adults in learning nonsense syllables, they retained them longer when learnt.[4]

It is at least probable, then, that pure retentiveness reaches its maximum during childhood and thereafter gradually declines. Until twenty or twenty-five this decline is (for most purposes) more than balanced by the increase in the ability to learn. Above this age there is a decline of both retentiveness and power to learn, though this decline may be almost checked until middle-age by constant exercise.[5]

It should be noted that the time of reproduction, that is the interval between the receiving of the suggestive impression and the appearance in consciousness of the

[1] Meumann, *Exper. Päd.*, i., p. 193.
[2] Ebbinghaus, *Grundzüge*, i., p. 622.
[3] Thorndike, *Notes on Child Study*, p. 83.
[4] Meumann, *op. cit.* i., p. 193.
[5] *Ibid.*, p. 197; Ebbinghaus, *op. cit.*, i., p. 622; *cf.* below, Appendix B.

idea suggested by it, is very much longer in children than in adults.[1]

Can the Memory be Improved? As on the question of the growth of memory, we find here the most opposite views, and once more are forced to draw the distinction between learning and retaining. There is no doubt that the power of learning, involving as it does the attention and the whole technique of memorising, can be greatly improved by exercise and proper training. Moreover, this improvement will manifest itself, to some extent, in the case of other material than that used for exercise. Thus Prof. Meumann found that practice in memorising nonsense syllables produced an improvement in the memories for foreign words, pieces of prose and verse, letters, numbers, etc., as well as in that for other nonsense syllables.[2] At the same time the improvement was greater for the kinds of material more closely related to nonsense syllables (namely, numbers, letters and nonsense syllables themselves) and less for the others. From this fact Prof. Meumann himself is inclined to conclude that there may be improvement not only of acquisition (attention, etc.), but also of retentiveness proper. This conclusion is, however, regarded as not warranted by other writers[3]; and we must say for the present that it is not proved that there can be improvement of general retentiveness. Yet the very difficulty of isolating in experiment the retentiveness proper from the power of learning makes the theoretic question of the improvability of the former of little practical importance. For, as both factors are always involved in the concrete, to improve one is to improve the memory. It is at least certain "that efficiency in learning, in committing to memory, can be increased

[1] Ebbinghaus, i., p. 655; Meumann, i., p. 227.

[2] Meumann, *op. cit.*, ii., pp. 53 ff.; *cf.* Barth, *op. cit.*, pp. 213, 214, and Stern, *op. cit.*, pp. 58 ff.

[3] See Offner, *Das Gedächtnis*, p. 216. W. James had previously denied that general memory could be improved, see *Psychology*, p. 296, and *Talks to Teachers*, pp. 123 ff.

and maintained at a certain level by sufficient exercise ".[1] This is all that is required for justifying some amount of formal memory-training in school—though the material used can be the ordinary material of instruction, and need not be nonsense syllables, or the pattern of the carpet (as recommended by Pestalozzi).[2]

At the same time, we can only be sure that exercise with one kind of material will lead to better results with another in so far as the two contain common elements,[3] or in so far as the improved methods of attending, introducing rhythm, noting relations, and so on are applicable to the new material. Thus in the improvement of memory in special directions the effects of exercise are much more clearly recognisable. Common observation tells us, indeed, that the habitual direction of the attention to any group of impressions very materially raises the retentive power in respect of these. The blind not only have better perceptions of touch than those who see, but recall and imagine touches in a way that we perhaps can hardly understand. Owing to this effect of a habit of concentration, each mind becomes specially retentive in the directions in which its ruling interests lie. Every special employment, such as that of engineer, linguist or musician, tends to produce a corresponding speciality of memory.

Experimental Investigation of Memory. In no branch of psychology has more experimental work been done than in the study of memory. Some of the results of this have already been referred to, but nothing has been said as to its methods. Although the field is far too vast to be covered here, a few words may be said on some of the main types of this kind of research.

One kind, begun by Ebbinghaus and carried on by Müller and Schumann and many others, consists in taking some uniform material—generally nonsense syllables of three letters—and inquiring how much of it can be

[1] Offner, *loc. cit.* [2] *Ibid.*; Meumann, *op. cit.*, i., p. 200.
[3] Thorndike, *Educational Psychology*, p. 91.

reproduced correctly after a single reading; how many repetitions are necessary as the number of syllables is increased beyond this amount; how many repetitions are needed to revive the associations thus formed, so that the syllables can again be recited after a definite interval; what is the best method of learning a long series of words or syllables—whether each reading should be of the whole, or whether it should be taken bit by bit; what is the most advantageous rate of reading; and so on.[1]

Another line of research aims at determining whether material is more readily remembered when presented to the eye or the ear, or when the kinæsthetic sense is involved, as in pronouncing or writing the name or drawing the object; or whether some combination of those possibilities is best.[2]

Another branch of this investigation is that of "association-experiments". In these a word or object is presented to the subject and he is required to say what ideas are called up. The object may be to determine the association-time, or to study the subject's prevailing types of association, and so on.[3] A recent application of the method aims at forcing the subject to betray his knowledge of some action or event, either by the nature of the ideas called up in his mind by certain "leading" suggestions, or by the lengthening of the association-times in these cases, which indicates that he is voluntarily inhibiting the ideas that first occur to him.[4]

This latter form of association-experiment has been closely connected with the so-called testimony-experiment (*Aussageexperiment*). This consists in making the sub-

[1] For an account of these experiments see Ebbinghaus, *Grundzüge*, i., pp. 617 ff.; or (in English), Kennedy, "On the Experimental Investigation of Memory," *Psych. Rev.*, v. p. 477.

[2] An account of Dr. Lay's experiments on complicative memory in the learning of orthography is given by W. H. Burnham, "The Hygiene and Psychology of Spelling" in *The Pedagogical Seminary*, Dec., 1906; see also Meumann, *Exp. Päd.*, ii., pp. 315 ff.

[3] Meumann, *Exp. Päd.*, i., pp. 204 ff.

[4] Münsterberg, *Psychology and Crime*.

ject observe a picture or object or some complex situation or event, and afterwards describe what he observed, as accurately as possible. These experiments have already been referred to as throwing light on children's powers of observation. Sometimes the procedure has been assimilated as closely as possible to that of the Law, with a preliminary deposition, a deposition on oath, and even a kind of cross-examination with misleading suggestions introduced. Such experiments have shown in an astonishing way what inaccurate testimony can be given in good faith about even simple happenings.[1]

Educational Discipline of the Memory.

Training of the Memory. As we have seen, there has been much discussion as to whether the memory can be improved by training. Yet, while it is doubtful whether pure retentiveness can be modified, it is certain that memory, in the sense which includes learning as well as retaining, is improvable, more especially for particular kinds of material.

Thus the teacher must aim at such improvement as seems possible, and in so doing he should keep in mind the different characteristics of what is meant by a good memory. These, as already implied, are: (1) aptitude in applying the mind to a subject so as to acquire knowledge of it; (2) a firm mental hold on what is thus learnt, or tenacity of memory; and (3) readiness in recalling and making use of what has been stored up in the mind. To this some would add a fourth excellence, *viz.*, fidelity or accuracy in reproduction. As Quintilian says: "There is a double excellence of memory, to learn easily and to retain faithfully" ("facile percipere et fideliter continere").

[1] L. W. Stern, *Beiträge zur Psychologie der Aussage*; A. Binet, *L'Étude Experimentale de l'Intelligence*, chap. xi.; Münsterberg, *op. cit.* As applied to young children, see C. and W. Stern, *Erinnerung, Aussage, und Lüge in der ersten Kindheit*, chap. viii.

A glance at these requisites suggests that memory-training falls into two main divisions: (*a*) exercising the pupil in a careful and methodical process of acquisition; (*b*) practising him in recalling what he has learnt. Although in practice these two branches of training run on together, we may, to a certain extent, treat them as separate processes.

Exercise in Acquisition: (*a*) Freshness. The first rule to be attended to is *to take the child at his best.* Committing anything to memory makes a severe demand on the brain energies, and should so far as possible be relegated to the hours of greatest vigour and freshness. The morning is now known to be the best time for learning —for most children at any rate.[1] Heavy preparation work in the evening, especially in the case of young children, is apt to be distinctly injurious.

(*b*) **Interest.** The next rule is that every resource should be used for making the subjects to be learnt as interesting as possible. The complaints of many distinguished men about the drudgery of school learning may remind us how easy it is to overlook this condition. A large number of boys have, like the old writer Schuppius, taken heart by committing things to memory "in the hope of afterwards forgetting them". It has been observed by an eminent teacher that "the memory of the young is very good if they care for what they are about". In order to secure this condition we must consult the learner's natural tastes to some extent, and keep in view what Locke calls "the seasons of aptitude and inclination". And we must further seek to develop a special interest in the subject studied. Perhaps one of the chief drawbacks to the teaching of the school as compared with that of the home is that it tends to put the day's lessons so completely outside the circle of home-interests, which are after all the child's real life.

(*c*) **Repetition.** Repetition is, as we have seen, of the

[1] The difference between morning and evening workers already referred to will be touched on again in the last chapter.

utmost importance. It has been shown experimentally that if certain material has to be learnt so as to be retained for any length of time, it is uneconomical to go on repeating it after it can be recited correctly; for this will not materially reduce the number of repetitions necessary on subsequent days, and in consequence the total number of repetitions required will be increased.[1] Not only so, but the more the repetitions are distributed, the better. Thus four repetitions on each of six successive days are much more efficacious than eight repetitions on each of three successive days.[2]

(*d*) **Methods of Learning.** Another question of practical importance is whether the material to be learnt should be read through each time from beginning to end, or taken bit by bit, as is usually done. Experiments have shown that unless the material is of markedly unequal difficulty in different parts it is more advantageous to read it right through each time.[3] A third, intermediate, method consists in dividing the whole up by short pauses, but going straight on and not returning to the beginning after each pause. This is recommended by Prof. Meumann as on the whole the best of the three.[4]

The advantage of learning as a whole is that useless and misleading associations between the end and the beginning of each section are avoided. Its disadvantage is that each portion receives the same number of repetitions, though some, being more difficult than others, require a larger number. The intermediate method, while avoiding obstructive associations, tends to produce an even distribution of attention, while varying difficulty can, to some extent, be allowed for by making the sections of various lengths.

Where the matter to be learnt is verbal, or other material capable of being presented to more than one sense, it is important to know which mode of presentation is the more advantageous. This has been dealt with

[1] Ebbinghaus, *op. cit.*, p. 629. [2] *Ibid.*, p. 630.
[3] *Ibid.*, p. 640. [4] Meumann, *op. cit.*, ii., p. 24.

above (p. 214). The use of the blackboard as an adjunct to an oral lesson is so important, partly because it provides for recapitulation, but largely because it introduces an appeal to the eye. This will allow those pupils who are distinct "visuals" to make use of their favourite medium, while even those of an auditory type will probably be benefited.[1] The same, of course, applies to the use of maps, models and diagrams of every kind. More especially is it important to appeal to the kinæsthetic sense in intimate combination with sight or hearing, by making the pupils themselves write down the recapitulation, draw the diagrams, or make the models. Even the following of the outline of a map or figure with the finger will be of advantage, by helping to secure analytic observation; if not also by adding the more vivid *motor* impression of form.[2]

(*e*) **System.** Lastly, the educator should make ample use of the great principle of *connecting ideas* on which all revival of impressions depends. In its bearing on instruction this principle includes two things: (1) the connecting one with another of the several parts of the new matter presented in the clearest way possible; and (2) the bringing of the new into its right relations to the old knowledge. In the case of material that is meaningless to the learner system and unity can only be given by means of accent, rhythm, rhyme, etc., all of which facilitate the apprehension of isolated units as parts of a single complex whole, as we saw in considering the conditions of attention (see p. 139). Meaning itself, however, forms a much more effective cement. The ease with which poetry can be learnt depends upon both kinds of connection. Prof. Ebbinghaus found that he could learn significant verses eight or nine times as quickly as material consisting of nonsense syllables.[3] Moreover, significant material is retained very much longer when learnt.[4]

Thus, in teaching a geographical fact—say, the situation

[1] *Cf.* Meumann, *Exp. Päd.*, ii., p. 25.
[2] *Cf.* Offner, *op. cit.*, p. 206.
[3] Ebbinghaus, *Grundzüge*, i., p. 629.
[4] *Ibid.*, p. 647.

of Liverpool—its relation to commerce, and to other places, as America and Manchester, should be made clear. Similarly, in relating an historical event, the due setting forth of the several actions and incidents in their proper order of time, and the pointing out of the causal relations of the occurrences, supply connections of ideas of the greatest value for the memory. Clear retention of what is heard is further aided by a certain systematising of the material, as when the more important events are used as a thread, upon which the subordinate events are strung, so to speak. Such orderly arrangement facilitates subsequent reproduction.

In building up these connections, special pains should be taken to select interesting ones. Children are, as a rule, greatly interested in the making, and other modes of origination, of things. Hence it is well in teaching to give prominence to their origin and their causes. For example, an Eastern country will acquire new interest when it is shown to be the source of such familiar and homely things as rice and tea.

In connecting the new with the old, again, there is ample room for the binding force of interesting connections. Thus historical facts become interesting, and are likely to be remembered, when they are presented as stages in the making of what are familiar institutions of to-day, such as the House of Commons.

What is especially known as "assimilating" knowledge implies the noting of the similarities in the new facts and ideas to what is already known. The bringing out of these relations of similarity—as in linking a foreign word to a similar English one, or a new historical fact to others of the same class, *e.g.*, the Norman invasion to earlier ones—serves to add interest and to fix in the pupil's mind important connections of ideas.

The teacher should, further, help his pupils to detect the points of contrast between the new and old facts. In this way a new fact takes on more distinctness, is less liable to be confused with other parts of knowledge, and

adds something to the mental system into which it is assimilated or apperceived. Children when they begin to describe in words what they see are apt to use expressions such as "This is a clean plate; not a dirty plate," showing how contrasts impress them and become links of connection between ideas.[1] In teaching early English history it is desirable to dwell on the striking dissimilarities between the Saxon and the Norman invaders, and between the effects of their invasions. In teaching geography, again, we may obtain the useful aid of a certain pleasurable excitement if we set forth wide and surprising deviations in habits of life from those of our own people, as when we point out that the Japanese eat with chop-sticks, and not with knives and forks.

We thus see that in order to retain his ideas a pupil has to *think out* the connections and relations of the facts. One may say, indeed, that the most effectual way of arranging the materials of knowledge for purposes of retention is precisely that which best subserves the understanding of the whole, and the surest means of learning a subject so as not to forget it is to think about it.[2]

Cramming is essentially learning by mere repetition without the systematising that comes from thinking out. Its results are so short-lived because, though they may be revived by the examination paper, they have no associations with other parts of the subject's knowledge by means of which they may be partially revived whenever these other parts are excited.[3]

Learning by Heart. The most constant of the bonds of connection between ideas which are made use of by the teacher is Verbal Association. In all cases—even in the object-lesson—the pupil is greatly aided by words in remembering what he learns. A special use of these verbal associations is illustrated in what is known as learning by heart. This implies that the learner firmly retains a

[1] See, for examples, *Studies of Childhood*, pp. 175, 442.
[2] *Cf.* W. James, *Talks to Teachers*, p. 123.
[3] James, *op. cit.* p. 129.

piece of knowledge in a definite verbal form, which form becomes a support of the series of ideas acquired, as well as a medium for reproducing these. The learning of the multiplication table, of grammatical rules, of the "chief towns," of historical dates, and of poetry illustrates the process.

There is, however, an obvious danger in this mode of learning: it tends to a mechanical habit of memorising the words merely, without a concurrent acquisition of the ideas. This parrot-like mode of learning is particularly insidious, and this for a double reason. The verbal memory being in general quick and tenacious in children, they are prone to lean on it to excess; and it is plainly a much simpler problem for the teacher to test whether a child has retained the verbal form than whether he has grasped the relation of ideas expressed by this form. It is now seen, not only that such verbal memorising is substituting the husk for the nutritious grain of knowledge, but that it is, in spite of its mechanical facility, tiresome to children. "Learning by heart (says Locke) . . . I know not what it serves for but to misspend their time and pains, and give them a disgust and aversion to their books."

It is probable that the modern revolt from the tyranny of words has led us to undervalue the legitimate service of language in learning. In many cases the embodiment of knowledge in a precise verbal form is clearly of the highest consequence. This applies to such things as to definitions and rules where the words are carefully selected for a special purpose and cannot be altered, and also to poetry and passages of prose where the literary form is an element of value.[1] Even in learning such a subject as history the verbal memory has its rightful place. What the teacher has to take care of is that he uses a child's verbal memory only as an auxiliary to the retention of ideas after these have been made clear and duly connected

[1] This has been well illustrated by Sir J. G. Fitch, *Lectures on Teaching*, pp. 131 and following.

one with another, and never as a substitute for this, and that his pupil shall not be slavishly dependent on the particular words of the lesson or the text-book, but be able to put his knowledge into other forms when required to do so. That is to say, learning by heart is permissible if it does not degenerate into an unintelligent learning by rote.[1]

Art of Mnemonics. In ancient times great importance was attached to certain devices for aiding memory and shortening its work, which devices have been known as Artificial Memory, *Memoria Technica*, and the Art of Mnemonics. Thus among the Greek and Roman teachers of oratory, emphasis was laid on a *topical* memory, *i.e.*, the connecting of the several heads of a discourse with different divisions of a house or other building. In modern times, too, attempts have been made to shorten the more mechanical part of the process of acquisition, as in learning dates by mnemonic word-forms and lines. This idea of relieving the strain of memory owed much of its apparent importance to the older theory that the main business of learning is to commit words to memory. Now that this theory is discarded, less importance is attached to a mnemonic art. When things are to be taught so as to be understood, it is rightly held that their relations of place, time, and cause and effect, as well as of similarity and contrast, should form the main basis of acquisition. In other words, the more things are connected in their *natural relations*, the less need there will be for the invention of artificial connections.[2]

Although there are no definite rules for aiding the memory which are valid in all cases, there is such a thing as a skilful management of the memory. This

[1] Strictly speaking, even what is called learning by rote derives some assistance from the associations of the ideas. As Jean Paul Richter drily observes, memory of words, as distinct from memory of things, would be best tested by committing to memory a sheet of Hottentot names. This reads like a prevision of our modern way of testing memory with nonsense syllables.

[2] For an account of the different systems of Mnemonics, see article "Mnemonics," *Encyclopædia Britannica*, and article "Memory" in *Chambers' Encyclopædia*.

will include the formation of certain intellectual habits, namely, concentration, judicious repetition, and the methodical selection and arrangement of our knowledge-material. Memory-labour is greatly economised by detecting what is important, and overlooking what is unimportant. When Simonides offered to teach Themistocles the art of memory, the latter answered: "Rather teach me the art of forgetting". Children should from the first be exercised in selection.

Learners will, half involuntarily, further the work of learning by all manner of devices that cannot readily be reduced to a definite formula. Thus one child in learning that the Tudors are followed by the Stuarts will notice the odd fact that the S's here *follow* the T's. One boy learned to distinguish the situations of the rivers Rhine and Rhone as north and south by noting the similarity of the vowel sounds to those of the words *high* and *low*. In studying a foreign language a learner will often shorten the labour by discovering fanciful, as well as real, resemblances between the new words and familiar ones in his mother-tongue. These devices are perfectly allowable so long as the parts of the subject-matter to be learnt are connected in an arbitrary way only, and do not supply the better links of "natural relations"; such are lists of words of all kinds and numbers. For example, the height of Snowdon, 3,571 feet, may be remembered as the first four of the series of odd digits, with the first transposed to the end. According to researches made by Sir F. Galton, it would appear that many persons in early life are wont to help themselves to retain what is difficult, *e.g.*, series of letters, numbers, dates, by picturing a visual scheme, as when the first twelve numerals are represented on a kind of clock-face.[1]

Exercise in Recalling. The teacher has to exercise a

[1] It is probable that these early number-schemes persist because of their utility in aiding the memory of the numerals. The student should consult Sir F. Galton's work, *Inquiries into Human Faculty*, pp. 114 ff. ("Number-Forms").

child's mind in ready reproduction for a variety of reasons. First of all, he requires to ascertain whether knowledge is duly retained. Again, in the newer and better kind of teaching he needs to recall old knowledge in order to make sure of taking the pupil on to an intelligent grasp of new ideas. Further, a systematic teacher will have again and again to examine the contents of children's minds in a wider and more searching way, with a view to make them ready in looking up facts when they are wanted, as in discovering the cause of a thing, in finding analogies and contrasts to some new fact, in supplying examples of a principle to supplement those given by himself, and so forth. The art of questioning, which rightly holds so high a place in modern teaching, is the great means of training children in such methodical recollection.

The vital importance of refreshing and recapitulating old knowledge is brought out most clearly by certain experimental results. Every teacher knows that a boy may have learnt a rule, or what not, so as to be able to recite it perfectly, and that yet by the end of a term, the knowledge may, for practical purposes, have completely disappeared. This is due to the fact already referred to, that repetitions in excess of those necessary to immediate reproduction rapidly lose their value. That is, it is not possible by repeating the matter to be learnt a very great number of times to ensure its being retained for ever after. On the contrary, the most economical method is, as we saw, not to exceed on any occasion the repetitions necessary to reproduction. On a subsequent occasion half the original number of repetitions may be needed for relearning, and the boy may seem to be in the same position as after the first learning. But if now the number of repetitions needed after a further interval equal to the first is counted, it will be found to be, not half the original, but considerably less, perhaps only a quarter. That is, the number of repetitions needed decreases with each relearning. This law is formulated by Prof. Ebbinghaus as follows: "Associa-

tions of exactly equal reproducing power lapse the more slowly the older they are, and the oftener they have been revived by renewed memorising".[1] Thus, after a sufficient number of recapitulations very little is needed to keep the knowledge at the reproduction point, as it may be called; though nothing *can* be learnt so thoroughly as to dispense with the need for recapitulation altogether, and the most economical way is not even to attempt this.

The Place of Memory in Intellectual Training. The value set on the training of the memory at different times and by different writers has varied greatly. The old idea was to identify memory and knowledge: "Tantum scimus quantum memoria tenemus".[2] No doubt, as we have seen, all instruction involves the activity of memory. Yet it is a long way from this to saying that the chief aim of teaching is to cultivate the memory. Intellectual education aims, according to the best theories, at a cultivation of intelligence as a whole, and at its best; and so at the development of the higher powers of "understanding" and thought.

Now a certain development of the memory is necessary to the due carrying out of these higher intellectual activities themselves. Unless the mind has acquired a good stock of clear concrete ideas about things, there will be no materials for the imagination to combine, or for thought to organise into general ideas. As Kant observes: "The understanding has as its chief auxiliary the faculty of reproduction". Dugald Stewart tells us that he can scarcely recollect one man of genius who had not "more than an ordinary share" of retentive power.

On the other hand, it is a matter of common testimony that when the whole stress of education is laid on exercising the memory the effect is apt to be hurtful to these higher powers of thought; "beaucoup de memoire, peu

[1] *Grundzüge*, i., p. 650.

[2] Miss Edgeworth gives an interesting account of the reasons why so much importance was attached to memory up to recent times. (*Practical Education*, vol. iii., pp. 57 ff.).

de jugement," says a French proverb. Similarly, Pope observes:—

> Thus in the soul while memory prevails,
> The solid power of understanding fails.

A right appreciation of educational values will lead the teacher when training the memory to exercise the child's intelligence as a whole, and in particular to train him in so arranging his memory-material as to give the chief and central place to the essential and important ideas. Such arrangement is already a step in classification, that is, in methodical thinking. It is the distinguishing mark of what Dugald Stewart called a "philosophical memory," that is, of the orderly memory at its best.

CHAPTER XI.

PRODUCTIVE IMAGINATION.

Reproductive and Productive Imagination. The process of reproduction involves a recalling of percepts under the form of images. It is thus a form of imagination. But what is popularly known as *imagination* implies more than this. When, for example, we imagine a new experience in the future, say a tour abroad, or reconstruct the actions of an historical person, the images called up are no longer in their form and mode of arrangement a reproduction of past experiences. The results of experience, the groups of memory-images, are in this case undergoing a change: they are being modified and rearranged. Hence this form of imagination has been marked off as Productive Imagination.

The Constructive Process. (*a*) The process of constructing new images, like all intellectual elaboration, requires first of all certain materials, namely memory-images. These do not need to be revived distinctly in their original form, being modified by the special needs of the new situation. A child in trying to form an idea of an African desert or of the Spanish Armada necessarily goes back to some of his own experiences, such as the familiar stretch of sand on the seashore, or a fleet once seen at Portsmouth or elsewhere, recalling just enough of these experiences to have the material needed for forming the new idea.

It follows that the excellence of the constructive process is, in every case, limited by the fulness and the clearness of the memory-images. Unless a child has seen

objects resembling those now heard of, and can call up clear images of them, the whole process of construction is arrested. The child that can most clearly recall the appearance, the glare and heat of the sand on a summer day will, other things being equal, most readily form an idea of the desert.

(*b*) The images of memory thus recalled at once undergo modification. They tend to form *a new organic whole*. In its earlier phases the process is comparatively passive and unconscious, the memory-elements largely rearranging themselves, so to speak. The organisation is aided in all cases—in that of the child picturing the desert, as well as in that of the poet creating a scene in Hades—by this automatic rearrangement, which supplies what may be called the first *draft-image*, the rough outline which has to be carefully filled in or developed afterwards. It is this detailed development of the draft-image which illustrates the orderly process of construction. The mind here goes in search of material, and carefully compares and selects what is fitting, what helps to make the image more complete and more "real".

This part of the process illustrates the controlling and directive action of an enlightened will. When an artist elaborates a new idea, say, for a picture, his selection of this and that feature is a process of volition, a *choice* of what is recognised as good for his purpose, what will combine harmoniously and pleasingly with the other elements selected. This choice is clearly guided by a sense of what is fitting, that is to say, by a discriminative *judgment*. The finer this judgment the better the result. The great poet is one who not only has a great wealth of imagery, but a fine sense of æsthetic fitness and harmony.

This last feature of the process is closely connected with the use of language. Words are, as we shall see presently, abstract symbols, and in order to interpret them pictorially the mind must, as Dr. Bain puts it, "reduce the abstract to the concrete". Thus, if I try to give a boy an idea of Othello by saying that he was a big dark-skinned man

with turban, etc., it is evident that in using the words "big," "man," etc., I suggest to his mind a number of general ideas. It is only by a sufficient combination of such verbal symbols that the learner is able to arrive at a clear individual representation of the object described. The same process of reducing abstract symbols to concrete representations is seen yet more clearly in following the scientific description of an unknown species of plant or animal.[1]

The mind has been exhibited above as going in search of material, selecting this according to a plan and judging, as well as using language and abstract ideas. All these are characteristic of the higher processes we call Thinking, and will be fully described later on in connection with these. For the present, the chief points to be dealt with are the materials used in imagination and the modes of modifying and rearranging these.

Classification of Constructive Activity. The process will assume a slightly different form according to that which controls it. In reverie the images follow one another by mere strength of association so long as their feeling tone is pleasant. In dreams the lack of control is still more evident, and the associations are in consequence much more difficult to trace on waking. In artistic construction, as we have just seen, it is a sense of beauty, of harmony, which determines the rejection of this imaginative element, the selection of that. On the other hand, a child when imagining a desert, a glacier, or other strange object described to him, is guided by a sense of consistency and of truth. He wants to understand, and he tries so to combine his material as to produce an *intelligible whole*.

We have illustrated the higher process of constructive elaboration in two dissimilar lines of activity, the understanding of a description of an unknown object and artistic invention. Although both of these processes are examples

[1] On the nature of this imaginative process, see Lloyd Morgan, *Psychology for Teachers* (new edition, 1906), chap. ix.; and G. F. Stout, *Analytic Psychology*, vol. ii., p. 267.

of intellectual construction, *i.e.*, elaboration of materials gained by way of sense-perception into new imaginative forms, that of artistic production is of a much higher kind. It involves creation and may be called *Originative Imagination* as distinguished from a mere imaginative assimilation of another's ideas, which, though a process of activity, is a simpler process, and by contrast may be called *Interpretative Imagination*.[1] The poet's work in picturing a new scene, and combining a series of such scenes into a work of art, is a highly complex process, and presupposes a rare form of intellect. Many a child can follow a geographical description, and appreciate a fairly simple poem, and yet be quite incapable of creating new ideas for himself. It is the same with scientific knowledge. It is one thing to assimilate a fact discovered by another and well described, quite another thing to discover a fact for oneself by a process of constructive invention.

The process of imaginative construction just described follows different directions, which in an adult may be conveniently classed under the following heads: (A) Æsthetic Imagination, which subserves the gratification of feeling. (B) Intellectual Imagination, which subserves knowledge.

(A) **Æsthetic Imagination.** Æsthetic Imagination is subservient, not to the attainment of knowledge, but to the satisfaction of feeling. When "day-dreaming," we let our fancy go for the sake of the pleasure which the train of images brings us. This illustration suggests that the unity of the constructive process is here due to the control of a dominant feeling, such as the wish to transcend our commonplace surroundings, to experience a new and rare thrill of enjoyment. It is under the influence of this dominant feeling that the mind selects its images, combining them in forms which best harmonise with, and so sustain and increase, the pleasure.

The "romancing" of young children shows us that their imaginative activity is very much under this sway of

[1] These terms are due to Mr. Johnson of Cambridge, and are used by Miss Brackenbury in her *Primer*.

feeling. Little boys and girls love to build up a region of fairyland decked out with the brightest colours, and greatly surpassing, in its wondrous scenes and adventures, all that the everyday world supplies.

In this case, too, we may distinguish between the Interpretative and Originative varieties of imaginative activity. The former is illustrated in children's ready assimilation and enjoyment of fairy-tales and romantic stories. In this process the activity, though sustained by pleasurable feeling, is controlled by the form of the presented story. Where, on the other hand, a child invents a story for himself the whole process is freer, and the "feeling tone" of the images has fuller sway over their selection. The highest form of this æsthetic creation is seen in the originative construction of the poet. Here we have a rich store of intellectual material, a variety of model forms for the new constructions, which are the product of a wide and varied experience and study, and a fine selection of the fitting, under the guidance of a refined and trained taste.

The Image and the Self. There is in particular one image which it is worth while to consider before going further: it is that of the Self. Considering the lowest level of intellection we find that the sensations arising from the body must bulk very largely in the infant mind and react on what it has of feeling and of will. Once more, as memory develops, an image of the body will be formed, and this will soon have complicated with it the peculiar qualities of being ever present and conditioning sensation and feeling (see p. 165). Such an image, which is not as yet by any means the adult's notion of self, much less the philosopher's Ego, is very prominent in the imagination of children. Nearly all their creative imagery consists in placing the self in new surroundings and amidst strange adventures. "Castles in the air" to be dwelt in "when I'm a man" are also characteristic of a certain period. The part played by self in imagination will be pointed out as we pass in review the several forms.

(B) **Intellectual Imagination.** This is to the teacher

perhaps more important than Æsthetic Imagination, and will be treated at greater length. The subject will be subdivided according as imagination helps—(1) *Apprehension of the Physical World;* (2) *Apprehension of facts of Mental Experience;* (3) *Practical Contrivance.* These will first be treated in their lower forms and then reconsidered in their Originative aspects.

(1) **Imaginative Apprehension of the Physical World.** A moment's thought will show us that every extension of our knowledge beyond the bounds of personal observation involves some amount of imaginative activity. This is seen alike in the acquisition of new knowledge from others respecting things, and in the independent discovery of new facts of the physical world by anticipation or imaginative prevision. The first is the lower or Interpretative form of intellectual imagination, the second the higher and more Originative.

Imaginative Assimilation of Instruction. The process of recalling and regrouping the deposits of past experience is illustrated in every case of acquiring knowledge from others through the medium of language. What is ordinarily called "learning," whether by oral communication or by books, is by no means simply an exercise of memory; it involves a peculiar exercise of the imagination. All that is immediately presented to the learner by the teacher is a series of verbal sounds. In order that the meaning of these presented word-symbols may be realised, it is necessary for the learner to develop suitable mental images of the objects described. In other words, he must imaginatively construct a corresponding group of ideas.

In order to illustrate this process of constructive realisation let us take the case of a teacher describing a glacier to a child. He begins, we will suppose, by questioning him about his experience and previous knowledge of ice, mountains and waterfalls. Here we see at once that the constructive process is a re-shaping of old knowledge. At first only a vague schematic formation of the glacier is reached; say a big, big, frozen torrent; then, as fresh

touches are added, this outline or "schema" of an imaginative representation is gradually made more special and more concrete by the incorporation of characteristic details. Thus the mental picture of the glacier grows more clear as the crevasses, the moraine at the side, and other details are described.

We thus see that the whole process of formative imagination is carried out by a modification and adaptation to a new purpose of ideas already possessed by the learner; and further, that the gradual development of a distinct image proceeds by means of a kind of synthesis of elements, the analysis of which has previously been carried out by the teacher. This synthesis or combination of elements involves a series of determinations or specialisations by means of which what was a vague outline grows into a more concrete and detailed picture.

In this, as in other forms of the acquisition of knowledge, a double process of assimilation and discrimination is carried out. A child assimilates a description of an object, or a historical narrative, by mentally connecting it with what resembles it in his familiar experiences. Goltz, Lange and others have shown how the child's mind in this intellectual apprehension of a verbal description spontaneously translates the new into the old, apperceiving the new verbal presentation by help of familiar home experiences.[1]

But assimilation by help of pre-existing similar ideas is not enough for accurate realisation. In following a teacher's description, children, through the very necessity of going back to similar ideas, are very apt to import too much into their mental picture, taking up the particular accidental associations with which their individual experience happens to have invested the words used. Thus Lange tells us that as a child he "pictured chaos to be similar to such a flood as was often caused by the Saale River, at a certain place, in the centre of which was a pond surrounded by gloomy lime and willow trees".[2] A

[1] See Lange's volume, *Apperception*, pp. 70 ff.
[2] *Op. cit.*, p. 72.

child necessarily reads the concrete facts of his experience into the descriptions and narratives he hears. Hence in order to get an accurate grasp of meaning he has to be led to discriminate and select, discarding features of the old which do not fit the new purpose. The new increment of knowledge must not melt into the apperceptive system, but add a new element to it.

On the success of this imaginative effort depends to an important extent the understanding of the description. Understanding of a concrete object means exercising reason or thought, and is a very different thing from imagination; yet it is aided by the latter. If, for example, a child, in following a description of an iceberg, does not imaginatively represent, vaguely at least, its great size, he will not be prepared to understand the danger arising to ships from such a floating mass. As commonly used by the Herbartians the term "*apperception*" comprehends this higher stage of mastering and understanding the new. Here we see the close relation between clear imagination and clear thinking, a relation to be spoken of again by-and-by.

(2) **Imaginative Apprehension of Mental World: Moral Directions of Imagination.** Another direction of intellectual imagination concerns itself with the facts of the inner life, with the ideas, feelings, and other processes of the mind. Knowledge of these facts underlies all that mutual understanding which makes social intercourse possible, all that we call sympathy, and, further, all moral insight into the good and bad aspects of others' characters.

As in getting an imaginative grasp of new objects and events in the external world the child must use a stock of previously acquired images; so here all sympathy, and all understanding of the inner life of others, must start from an image of the self, at first of course more or less imperfect. The principle of the Organic Circuit, that is to say, of action and reaction leading up to a more complete apprehension, here comes again into play: the child's attempt to apprehend other selves reacts on his idea of

his own self, and this again reciprocally on other selves, as will be illustrated more fully later.

In this apprehension of the inner life there is a true process of construction precisely similar to that by which external objects are apprehended. A child imagines how he would feel and act if placed in the position, say, of Prince Arthur in the Tower, by help of materials gathered from his own experience of confinement and despairing misery. There is in this case, too, a process of rearrangement and construction directed to the gradual development of a clear out of a vague idea.

Now we know that a child cannot, in an abstract way, fix his attention on ideas of mental states, whether his own or those of another; and many adults share in this incapacity. In realising how Prince Arthur would feel shut up in the Tower a child proceeds by representing external facts, both those of the situation, and those of the expressional movements called forth by the feelings. That is to say, the realisation of another's mental state is supported by a true process of pictorial imagination.

(3) **Practical Contrivance.** A third variety has to do with the construction of ideas of new actions, ranging from simple movements such as are required to produce a new effect, say, a verbal sound, up to complex actions, such as are involved in learning to play a musical instrument, or in fitting together material things, so as to obtain a new mechanical device. Here, too, the image of the self plays an important part, for this variety is characterised in part by the presence and prominence of motor ideas (ideas of our own movements) together with their external results. As such, although it is intellectual in the sense that it furthers our knowledge how to do things and to produce new external results, it is essentially *practical*, and forms an important constituent in the development of our active powers, the learner being called on to reproduce what has already been learnt, and to adapt this to new circumstances and new needs. Thus in learning to climb the stairs or to put on his shoes, a child readjusts previous

acquisitions, fitting them to the new aim of the moment. Here, again, we may distinguish between a receptive and a more original form of construction. Much of a child's motor acquisition is imitative, and so receptive, or interpretative. This is illustrated plainly enough in play, which is often a mimicry of the serious actions of adults, and in many school exercises such as singing, writing and the movements of drill.

Kinæsthetic Images. The images of movement spoken of above are known as Kinæsthetic Images. Their importance will require us to speak of them again, especially in the chapter on the origins of Voluntary Movement. In connection with language, too, they play an important part, for, while to most people, perhaps, the image of a word is mainly a representation either of its sound or of its visual symbol, to some it represents chiefly the articulatory movements of the tongue, lips, etc., in pronouncing the word (see above, p. 199). The question how far they enter, in distinct form, into practical construction will be considered later.

Originative Forms of Intellectual Imagination: (1) Discovery. The discovery of new facts and the laws which govern these is largely a matter of careful observation and of patient reasoning from ascertained facts and truths. Yet imagination has an important *rôle* here also. The inquiring, searching mind is always moving forward into the region of the unknown in the form of conjecturings, as—How would this substance behave if placed in such and such conditions? To guess a fact, whether it be a secret of Nature or one known to another, involves the bringing to bear on the problem of this and that element of our previous knowledge, and the making of various tentative combinations of these elements, until we feel we are getting near the desired solution. Children's experiments show a germ of the "scientific imagination," that is to say, of the intelligent constructive "guessing" by which the student of Nature penetrates into her mysteries. This scientific imagination implies a good accumulation of suitable know-

ledge to start with, and a facility in inventing new suppositions or "hypotheses" which have afterwards to be tested or verified.

(2) **Moral Direction.** In the case of Inner Apprehension also we have the distinction between a more mechanical process of apprehension and an originative process of discovery. This applies even to the apprehension of another's feelings and intentions through the medium of his outward movements, etc. It is comparatively easy for a child to read off the emotional signs of cheerfulness or "crossness" in a teacher; much more difficult to find his way to the fact by a process of imaginative inference from the teacher's actions. The same applies to those experiences which are presented still less directly by the medium of verbal description. In following an account of a pathetic story a child's imagination is moving obediently to the lead of the teacher's words; in trying to imagine how a particular historical or other person is likely to feel or act in given circumstances he is much more of a discoverer.

Closely connected with this imaginative apprehension of other minds is the *moral* direction of imaginative activity. This is illustrated in the imagination of some new fact in moral experience, say the results of a good or a bad action. A large demand is made on the imagination, as we shall see later on, in all that sympathetic insight into others' needs and claims which forms so vital an element in a morally good disposition. Imaginative activity enters further into the development of new and higher forms of personal aspiration towards a higher moral level. In youth, more particularly, the directions of desire and effort are largely swayed by *ideal representations*, the product of an ardent and intense imaginative activity carried out on material supplied by the character of some moral hero, *e.g.*, the teacher or some admired character in history or fiction.

(3) **Invention and Experiment.** From the lower and receptive form of practical contrivance we must mark off the higher form of *free invention*. Children find out

many new combinations of movement with little, if any, guidance from others. By successive tentatives, in which the forms of previously acquired movements are modified, an approximation will, under favourable circumstances, be made to the needed combination. This is another application of the principle of the Organic Circuit, the idea acting on the attempt, and the attempt reacting on the idea, and so on, each successive stage of the process carrying the required adaptation a step further. All mechanical invention, *e.g.*, of a new and more economical gas-burner, illustrates the same process of practical constructive adaptation of old ideas.

Much of this new constructive work is of the nature of scientific experiment. By such experiments the impulse to find out how to do things reacts on the more intellectual impulse to understand things. A considerable part of a child's inventive activity, as when he rolls his ball, throws things into the water, and so forth, is experimental, being motived by the desire to see what will happen in certain circumstances. The boy's manipulation of things shows the experimental impulse determined by more definite anticipations of results.

Originative Imagination and Thought. It will be seen that in these sections on Originative Imagination we have dealt with the formation of ideal conceptions and hypotheses, with discovery and invention. This, together with the remarks on p. 201, may cause the student to wonder whether imagination and thinking are not after all identical. It is admitted that no clear boundary-line can be drawn between them, and that it may be only a difference of point of view that causes us to call a given process now imagination and now thought. When we consider the aim of an hypothesis and its relation to inductive reasoning in general, we allow it to be thought; but when we consider it as composed of images grouped in such and such a way, we call it imagination. Originative imagination consists generally, we may say, of a central thought round which images cluster like a swarm of bees around a queen.

Intellectual Function of Imagination. The evils attendant on the more exciting and uncontrolled forms of imaginative activity have led many to think little of its intellectual value. It has been customary to oppose the Imagination to the serious truth-loving Understanding. To a narrow, practical intelligence the imagination is apt to seem a wild disturbing force in the orderly economy of mind. Even writers on the human mind have followed the popular judgment so far as to form a low estimate of the intellectual service of imagination. It is undeniable that imagination, when subject to the caprices of feeling, is obstructive to the finer intellectual work. Yet, as we have seen, the calmer and more disciplined forms of imaginative activity are a vital factor in the process of cognition. By far the larger part of our knowledge of the surface of our planet, of the past history of our race, of the hidden world of human feeling and thought, is acquired by a strenuous methodical exercise of the imagination. Hence, other things being equal, children of bright imagination are better learners than unimaginative ones. Imagination remains, too, an integral part of intelligence in its higher and more valuable developments. A man of ready insight, quick to apprehend a new fact, a new situation, a new idea, is essentially an imaginative man. Many of the greatest intellects, *e.g.*, those of eminent scientific discoverers and poets, are imaginative intellects. We are justified, therefore, in treating of the imaginative process as an integral part of the intellectual processes.

Early Developments of Imagination. Productive imagination, we see, depends upon a certain development of mental reproduction and the formation of a store of memory-images. Yet, as soon as this store has assumed only modest dimensions, the impulse to use it for purposes of imaginative production emerges.

An infant may be said to show a germ of imagination when the signs of anticipations of new experiences grow definite; yet it is not till language begins to be mastered that a freer play of imaginative activity grows distinct. It

is in listening to the simple narrations and descriptions of the mother or nurse that the process of fashioning new images is first exercised. A noteworthy point here is that children only show an interest in new stories after their minds have been first trained to follow verbal recitals of their own experiences.[1] That is to say, production follows in the wake of reproduction. When once a child has attained to readiness in reproducing his own experiences he will begin to show interest in new recitals. He seems at this stage to find new delight in picturing things. As Madame Necker observes: "The pleasure which the narration of the most simple stories affords children is connected with the vivacity of the images in their minds."

Children's Fancy. After a certain amount of exercise of imaginative construction in this simple receptive form, children commonly show a spontaneous disposition to invent fancies of their own. This inventive activity of children's imagination is one of the most striking of their characteristic traits. It looks as if a strong impulse of creation, reinforced by the pleasurable excitement which comes from the first use of a new power, leads most children from about the age of three or four to throw much of their superfluous cerebral energy into this direction. Whatever the explanation, the fact is unquestionable, and it is a fact with which the educator has to reckon. The crudity of the images put forth, the absence of what has been called "coherency of internal organisation"[2] and of well-arranged plan, and especially of a guiding sense of probability, are some marks of what may be described as the play of "childish fancy".

At first the activity of this childish fancy connects itself closely with the perception of objects of sense. This connecting of the ideal with the real is illustrated in children's *play*. Play is, as we shall see later (chap. xviii.), the outcome of a number of impulses, all strong in the

[1] See Perez, *First Three Years of Childhood*, p. 96.
[2] This is given by Prof. C. H. Judd as a test of imagination, *Psychology: General Introduction*, p. 272.

early years. Among other things it is a striking exhibition of the vivifying power of childish fancy. When at play a child realises, by means of a lively imaginative activity which older people often fail to understand, the objects and situations which he is representing. The presence of a real object, the stick which serves as hobby-horse, the wisp of straw which does for a doll, supplies a basis of sensuous reality on which the imagination can the more easily construct its fabric. By the "alchemy of imagination," as it has been called, the stick or the wisp of straw becomes for the child more than half-transformed into a living thing.

This exuberance of imaginative activity shows itself commonly, too, in another form. A quite young child, after hearing a number of stories, will begin himself to model new ones. These fabrications show the influence of the child's own experience and observation as well as of the stories heard from others. At this period spontaneous fancy is apt to assume extravagant shapes. So common an object as a stone is treated as having sensation and feeling; or, if it happens to have a hole in it, may be transformed into the dwelling-place of fairies. A strong susceptibility to the excitement of the marvellous, and a childish love of what is odd and grotesque, are sufficient to sustain this romancing. Young children are wont to project themselves in fancy to distant regions of space, and to transform themselves into objects which to us seem not only quite unlike human beings but wanting in life. Thus one child when barely three years old was accustomed to indulge in the pleasing fancy of living in the water with the fishes, of being a beautiful star in the sky, and so forth. The daring of these combinations is to a considerable extent accounted for by the child's ignorance of what is impossible and improbable. For this reason, much of children's lying should not be regarded as a serious moral offence.[1] Judgment as to truth and probability

[1] See Meumann, *op. cit.*, i., pp. 248 ff.

comes later, as the result of reflection on a wide experience.[1]

Imagination Brought under Control. The growth of knowledge and the development of the mental processes as a whole lead to marked changes in the activity of imagination. From the first more excited and capricious form, it gradually passes into a calmer and more orderly mode of activity, in which it is controlled and disciplined by an enlightened will. That is to say, its activity becomes more and more directed by the sense of what is true and probable. This process of development shows itself even with respect to fiction itself. As soon as a child gets a clearer idea of the general forms and conditions of human experience the old nursery tales cease to satisfy. Their place is taken by stories dealing with actions which conform to the fixed circumstances and laws of real life, *e.g.*, histories of children, their doings and experiences. In this way the earlier impulses, such as the love of the marvellous and a feeling for the grotesque and ridiculous, are restrained by the addition of more intellectual motives, a desire to learn about things, and a regard for what is true to nature and life; and this result is seen still more clearly in the gradual subjection of the imagination, in the orderly processes of learning, to the ends of knowledge and truth.

Later Growth of Imagination. While the development of the higher processes of thought tends in this way to restrain and guide the movements of childish fancy, it is a mistake to suppose that imaginative power ceases to grow. We are apt to attribute to children a specially high degree of imaginativeness just because we are struck by the boldness of their conceits, their remoteness from the familiar forms of our experience. Yet the same child who performs one of these "feats of imagination" would show himself very slow and inept, as compared with an educated

[1] The characteristics of children's imagination are more fully described in my volume, *Studies of Childhood*, chap. ii. ("The Age of Imagination"). *Cf.* Meumann, *loc. cit.*, pp. 242 ff.

adult, in constructing a clear mental representation of an unknown natural phenomenon, such as a Swiss mountain, or of an historical event. This suggests that what we call imaginative construction goes on developing with the gradual assimilation of the fruits of experience, as well as with repeated exercises in constructive activity. Its feats may grow less startling to us: but in reality it now begins to achieve far greater triumphs in the growing command by the mind of nature, history, and the rest of our complex and wondrous realm of reality. A precisely similar change takes place, as Mr. Herbert Spencer has shown, in the development of imagination in the race.[1]

Educational Control of Imagination.

Training of the Imagination. The notion that the educator has a special work to do in exercising and guiding the imagination of the young is a comparatively new one. The common supposition of the inutility, not to say the mischievous nature, of the faculty has naturally led to the idea that if education has anything to do with a child's imagination it has merely to check its activity. It is to be hoped, however, that a clearer apprehension of the scope of imaginative activity, and the important part it plays in the work of the intellect, will turn teachers' attention more and more to the problem of developing it.

(*a*) **Restraining Fancy.** The educator has, no doubt, to exercise some negative or repressive control over the early movements of imagination. He will do well to remember that, as Miss Edgeworth observes, imagination, like fire, "is a good servant but a bad master". Owing to the ignorance of children about nature and life, to their natural excitability, and to their fears and other emotions, the possession of a lively imagination, apt to dwell on and exaggerate emotional ideas, exposes them to special dangers. Locke and others have shown how dread of the dark and

[1] *Principles of Psychology*, ii., §§ 491, 492.

other miseries of childhood spring out of an over-excited imagination. In many children, at least, stories about hobgoblins and other gruesome figures may excite the imagination to a pitch which is morally dangerous and even disturbing to health. The tendency to give vivid reality to all that is suggested by words and otherwise, shows itself in the effects of their dreams, which are apt, especially in the case of nervous and sensitive children, to take a dangerous hold on their minds. This has been illustrated by the fact that children of abnormally vivid imagination tend to believe that they have actually seen what has merely been suggested to them by another's words[1] (see below chap. xx.). All this goes to show that those who have the care of young children should take pains to ward off too exciting, and especially painful, stories dealing with the terrible, horrible, etc. Not only so, even a tendency to grow excessively absorbed in "the pleasures of imagination," more especially those of day-dreaming, should be corrected by calling forth the activities of the child's mind in grappling with real facts, and in carrying out interesting and useful kinds of work. Yet the educator will do well to remember that an exceptional bent towards day-dreaming has marked the dawn of more than one poetic genius.

In this curbing of childish fancy, however, much discriminative judgment is needed. It is a gross error to over-estimate the evils of imaginative indulgence, as in suggesting that it were well to shut out children from the realm of fiction altogether. It may be said that the creation of a super-sensible world, the glorious realm of fairyland, is natural and appropriate to childhood. It is the source of much pure delight, and the fond illusion which enters into it tends in ordinary cases to disappear with so little sense of shock or conflict that its harmful effects become inappreciable. It is only in cases where imaginative activity grows rank and threatens to choke

[1] See Motet's curious work, *Les faux témoignages des enfants devant la justice.*

other important mental growths, that a decided interference on the part of the educator is called for.

(*b*) **Cultivating the Imagination.** But here, as elsewhere, education is never merely negative; it diverts energy into other and better channels. While checking certain directions and forms of early imagination the educator should aim at developing it along healthy and profitable lines. In truth, as Madame Necker tells us, "we only restrain the imagination when we exercise it".

In childhood this "play of fancy" (like other play) is valuable as a *preparation*—namely, for the serious intellectual work to follow. Just as the infant's plump unformed hand, by its seemingly idle and purposeless manipulations of whatever comes within reach, is acquiring strength and precision of movement for the work of after-life, so the imagination develops into a strong and flexible organ by what are apt to seem to older people foolish indulgences.

In this cultivation of the imagination the educator has to subject it to the discipline of a methodical procedure. The narration of a good story in a clear, orderly manner constitutes such a disciplinary exercise. These exercises, which should be carried out in the home before school discipline begins, train the young mind in keeping the attention fixed, and in a progressive formation of a consistent and intelligible whole out of a series of verbal presentations. Happy those children who have a cultivated father, like Leslie Stephen, to introduce them by his impressive readings to the realm of good literature.[1]

In this training of the imagination we must attend to the natural laws of the process. The educator should see —testing the point by questions where necessary—that the child has the requisite stock of memory-images, and should begin with comparatively easy exercises, involving ideas of a simple structure and related, in their form as well as in their constituent parts, to familiar childish

[1] See Prof. Maitland's *Life and Letters of Leslie Stephen*, pp. 474 ff.

experiences and observations. A child may, for example, be called on to picture with his mind a snow mountain, because he is familiar with the snow and with some hill, or at least with a picture of one, and can, moreover, easily combine the two by help of some analogous observation of his own, *e.g.*, the roof of a house covered with snow. On the other hand, it would be foolish to expect him to imagine so complex an idea, one so remote from his experience, as a chain of snowpeaks with the glaciers, etc.

The close connection between vivid imagination and feeling renders it desirable in the early stages to make a judicious appeal to childish feeling. The scene or action to be pictured should excite a certain wonder, or attract by its prettiness, or by its amusing or pathetic character.

All this suggests that in spite of the attacks made on them, the established favourites of the nursery, fairy-tales and stories of all kinds, form, by their direct and strong appeals to childish feeling, the best beginning in the culture of imagination.[1] In order, however, to secure this educational value of stories, a wise selection must be made. A good deal of so-called children's literature is bad, not so much from its moral tone, as from its unsuitability, being written too much from the grown-up point of view, and in ignorance of children's feelings and likings.[2]

Exercise of the Imagination in Teaching. Although, however, stories form a valuable means of cultivating the imagination at first, they need to be followed up by that higher kind of exercise which is involved in acquiring real knowledge. Most oral teaching, so far as it has to do with concrete facts, proceeds by an appeal to the child's imagination. An intelligent parent who talks to his child about the wonders of nature, such as the formation of clouds and rain, the movements of the earth and the stars, is

[1] The fact is clearly recognised by Isaac Taylor in his judicious remarks on the use of fiction, *Home Education*, chap. ix., pp. 260 ff.

[2] This has been clearly pointed out by Mr. E. V. Lucas with respect to a good deal of the poetry which is said to be suitable for children. See his article on "Some Notes on Poetry for Children" in *The Fortnightly Review*, September, 1896.

continually drawing out the learner's imaginative activity. All instructive teaching, too, about the facts of human experience, including the thoughts and actions of the wise, the great and the good, opens up another wide and attractive arena for the exercise of the imagination.

The conditions of a wise and efficient exercise of the imagination can be illustrated best of all by a reference to those comparatively concrete branches of knowledge which make a specially large appeal to this form of mental activity. In simple forms of Biography and Travel, later in elementary History and Geography, the teacher is largely engaged in guiding and superintending the movements of his pupils' imaginations.

The first thing the teacher has to attend to in such teaching is *the form of presentation.* A suitable form implies a careful selection of the language used. This must be at once intelligible and forcible in point of suggestiveness. The imaginative activity of a child is most effectually stimulated by simple homely words which tend to call up instantly the required ideas and combinations of ideas. The teacher should understand, too, the function of striking figures of speech, metaphors, etc., by which vividness and force may be given to a description. He should be on the *qui vive* for ambiguous terms, remembering that children easily misapprehend our words, and are prone to put into them too much childish experience and meaning.[1]

In connection with this clear intelligible use of words, the teacher should *take the child's mind back to its own past experiences,* prompting him to recall facts which may aid in the apperception of the new ones. In thus utilising the child's own experiences, however, the teacher should be careful to help him to distinguish the new fact now presented from the old experiences. A teacher had been giving a lesson on Homer to a class of children aged about thirteen, in which she had spoken of the old

[1] Illustrations of such misapprehension of words are given in my *Studies of Childhood*, pp. 183 ff.

blind poet as wandering from place to place. She was afterwards much amused at finding one of her pupils translating the story into terms of everyday experience by describing Homer as "going *about the streets* singing".

Once more, the teacher should follow an orderly plan of description corresponding with the natural mode of working of imaginative apprehension. He should remember that *all knowledge develops by stages from a vague to a definite form.* Thus the description of a river, of a coast line, and the like, best begins with a general account of its situation, size and shape, and then proceeds by a detailed account of particulars. Similarly, in describing an historical event such as the defeat of the Spanish Armada, it is well to begin with a short general statement of the subject, including a reference to a few of the important relevant circumstances of the time, and in this way to lead the pupils to a general *schematic form,* in which the details of the particular event will afterwards find their natural place.

The teacher should note that when an oral lesson consists of the description of an object or a scene, a difficult piece of integrative synthesis is involved. A verbal account of an object necessarily proceeds by presenting the parts one after another in time, while the pupil has imposed on him the task of turning this succession in time into a co-existence in space. Thus in describing Mount Vesuvius the teacher may describe its height, its crater, the vegetation varying at different levels, and so on, and the scholar has to take the various bits of description which follow one another and fit them together in a whole of co-existent parts—a picture of the place. If the difficulty is not immediately apparent to the student, let him try the extreme case of imagining a complicated geometrical figure from a description only.

When, on the other hand, the lesson is of a narrative form, describing the successive stages of an action, say the Conqueror's march after Hastings, the teacher may say, "He massacred the men of Romney, took Dover and

marched on London. He burnt Southwark, and after a little time of waiting received the submission of the chief of the English". Here there is no task set of combining the facts into a co-existent whole, but the succession in the narrative corresponds with the successive stages of the action.

A practical suggestion now arises. Is it possible to give to the dead abstract enumeration of the parts of an object something of the movement and life of the narration? This question has been answered by the greatest of German critics, Lessing. In his classical work *Laocoon*, when speaking of the limitations of the poet's verbal description in dealing with objects at rest, he illustrates his point by showing how Homer, in describing the chariot of Juno and the shield of Achilles, turns description into narrative form by telling the story of *how the object was made*, *i.e.*, by successive additions of parts. So our bald description of Vesuvius might have been made a narrative by describing an ascent of the mountain. Prof. Josiah Royce rightly urges that this turning of things by the teacher into actions introduces an important *dramatic* element, the love of action, which is at the bottom of our interest in the drama.[1]

The teacher should remember, too, that feeling is the life of imagination, and that in teaching a subject like geography the child's love of adventure and story may at first be best appealed to by connecting description with a narrative of some real or imaginary journey, its adventures, dangers, etc.[2]

Finally, in all this teaching of the concrete by way of verbal description the imagination of the learner should be assisted by a *judicious use of sense-presentations*. The important aid rendered to the child's imagination by the sight of a globe, a relief map, or a picture, is recognised in

[1] See Royce's *Outlines of Psychology*, pp. 254, 255.

[2] In Sir Joshua Fitch's valuable chapters on the teachings of geography and history (*Lectures on Teaching*, chaps. xii. and xiii.), the reader may see these points illustrated. *Cf.* I. Taylor, *Home Education*, p. 255 *et seq.*

modern methods of teaching geography. The advantage derivable from these appeals to the eye is due, not merely to the circumstance that they present the parts in a co-existent whole, but to the fact that our images, even at their best, fall short of sense-perceptions in their completeness and distinctness, and in the coherence of their parts. Seeing the object itself is worth a hundred descriptions of it, both for the formation of an adequate and clear idea, and for the understanding of the thing (*cf.* above, p. 198).

A similar aid is rendered to the historical imagination by the sight of coins, old buildings and the like, all of which make direct appeal to sense-observation. Much more use might be made of such relics of the past in the teaching of history and of literature, especially where, as in London, these legacies are so rich and so readily accessible.

Yet while pictures have a real use in education, they have their characteristic dangers for very young children. To begin with, a picture is an abstract, and in a sense a falsifying, representation of a material thing. How hard it is for children to catch the true representative meaning of a picture is seen in the errors they commonly make at first as to the real size, shape and distance of the objects depicted. Not only so, a picture when it represents life and action, falsifies by excluding movement, and a child is apt to be puzzled at seeing the huntsmen, for example, mounted on their galloping horses, yet remaining fixed on one spot. In truth the proper interpretation of pictures, maps and the rest is one part of the early training in observation. From an educational point of view pictures need to be carefully selected.[1]

Cultivation of Invention. Since Rousseau's time educators have begun to recognise the desirability of now and again allowing children to find things out for themselves. In the teaching of natural history, of geography, of history,

[1] On the naive mental attitude of a little child towards his pictures, see *Studies of Childhood*, pp. 309 ff.

of science, opportunities occur of encouraging children to picture and think out the results of what they know. Here, no doubt, we have to do with a process of thought, *i.e.*, of reasoning from the known to the unknown. Yet this reasoning grows out of imaginative activity. Thus, a child who clearly realises the situation of King Alfred among the Danes may be encouraged to find his way, in part at least, to the new fact of the King's disguise. Similarly, children who have had experiences of digging trenches in the sand of the sea-shore, may, by a judicious question or two, be led half to anticipate your information that the mountain torrents scoop out the valleys. The educator can render no greater service to a child than to develop this power of ready imaginative discovery.

Here, however, great judgment is needed. It is no doubt true that much mediocre teaching of to-day (like much mediocre art) sins by leaving too little to the imagination; children are often bored by being told what they are perfectly well able to find out for themselves. The new questioning method of teaching (see chap. xiv.) is of the highest educative importance. Yet errors are made in this mode of teaching also. It is very easy for an inexperienced teacher to expect too much from a child; and some of the questions "shot off" in this questioning method miss their mark by calling forth no definite line of responsive imaginative activity. You must know, with some degree of precision, how much latent knowledge there is in a child's mind, and, further, what are the precise attitude and the directions of activity of this mind at the moment (as determined by the immediately preceding instruction), if you are with unerring tact to put the apposite and fruitful question, the question which instantly starts the required line of activity. You need, further, to be on your guard against misapprehensions arising from misleading associations.

Cultivation of other Directions of Imaginative Activity. A word or two must suffice on the relation of the educator to the other forms of imaginative activity distinguished

above. The cultivation of the imagination in the apprehension of facts of the inner world is beset with special difficulties. It is much easier for a child to picture an object of sense than to represent another's state of mind. As suggested above, the teacher must here help the child by enlarging on the situation as bearing on the person's feeling and conduct; also on the external behaviour itself as the outcome of his inner state.

In addition to this difficulty, there is the fact that a child's experiences—his ideas, feelings and desires—differ profoundly from those of older people, so that it is hard for him to enter imaginatively into these. Great care must be taken to select simple experiences, such as can easily be imagined by help of analogies to the child's own experiences. Further, in describing facts of the inner world, such as the feelings, ideas and aims of an historical character, care should be taken to present the facts in simple, easily apprehended language, to go back upon simple experiences of child-life so as to secure the requisite materials, and to point out all discoverable analogies between the situation and state of mind described and those which arise within the narrower circle of childish experience. In this case, too, it is of importance to proceed methodically, to begin, say, an account of King Alfred's adventure at Athelney with a general account of the circumstances and the situation of a fugitive sovereign in disguise, and then to develop a more exact imaginative apprehension of his feelings by a skilful selection of the detailed facts.

Much the same holds good in the education of the practical imagination. A child, when carrying out any process of manual construction, should be led to see the resemblance between the new task and old ones, to note what is familiar, both in the general plan of the work and in its constituent parts, and at the same time to observe in what respects the process differs from those previously carried out. Further, he should be induced to reflect on his first errors and to learn from them how to approximate to the right way of reaching the required result. The simple exercise of

forming a new letter when learning to write illustrates these conditions. Ample room must, moreover, be provided for a freer construction, partly by the selection of toys—such as a box of bricks, or what Jean Paul Richter held to be the best of toys, a heap of sand—which offer an indefinite scope for varied constructive invention, partly by introducing into the methodical work of the kindergarten or school opportunities for inventing original designs.[1]

The cultivation of the æsthetic imagination is, in the main, similar to that of the intellectual. Its special feature is that it implies the development of a finer feeling for what is æsthetically fit, harmonious, and contributory to a total impression of beauty (see below chap. xvii.).

[1] The cultivation of an aptitude for mechanical contrivance in children is well illustrated by Miss Edgeworth, *Practical Education*, i., pp. 33 ff.

CHAPTER XII.

THOUGHT-ACTIVITY: PROCESS OF THOUGHT: JUDGMENT.

Thought as a Process. In the last chapter we had on several occasions to refer to the higher activities of thought, the crown of the intellectual processes. The power of thinking is by some psychologists denied to any but man, whereas it is asserted by others that the higher animals have this power. Even if we agree with the latter, it is evident to the least observant that, while in the case of human beings thought is characteristic, in that of animals it is a rare occurrence. The animal's capability of thought is apt to be much over-rated by unscientific persons, who see what may be only the finished product of a long process of Trial and Error. At the same time it has been shown by experiments that some animals learn to modify their behaviour by a perception of the results of their actions. The clearest cases of "animal thought" appear only on special occasions, marked by great mental excitement.[1] On the other hand, in some men thought-activity may become so altogether normal that one thought may follow another in long chains of reasoning, practically free from interference by perception, and, occasionally, in its highest form, due to no desire save for the pleasure attending this form of mental activity.

This does not, however, apply to the child or even to the average adult. Thinking in their cases is still spas-

[1] For the best account of the results of experiments on animal reasoning, see L. T. Hobhouse, *Mind in Evolution*, chaps. vii.-ix. On the germ of thought in animals see Ribot, *The Evolution of General Ideas*, chap. i., sect. i.

modic, its essential condition being a blocking of intellectual activity, due to some new situation which cannot be provided for in the usual routine. Thus if a lady is cutting out a new garment and finds that she is getting short of material, the modification which becomes necessary is an occasion for thought. In its early rudimentary stages, thought is essentially a practical function and follows some special need. Its importance lies in the fact that it assists in new adaptations or re-adjustments. Yet in the case of an intelligent child it soon begins to free itself from practical needs and to assume the form of activity directed to a *theoretic* end—the attainment of clear and consistent ideas of things.

Under the title of Originative Imagination we considered some cases where a central idea attracted to itself a number of images harmonising with it in a certain way. The finished product we called a system of images, though the central idea was a thought. All thinking is more or less of this type. "We start from a comparatively fixed central idea or intuition and work along the several diverging lines of ideas associated with it. . . . What seems relevant is at once contemplated more closely, while what seems irrelevant awakens little interest and receives little attention." [1]

The classification of a flower and the solving of an easy problem may be taken as simple illustrations of thought as elaborated in adults. In each case we have a central idea or notion of what we are seeking, and this we try to make more perfect or definite. When we have arrived at the proper associations the process is complete.

Thus in classifying "Potentilla," we notice that it appears to be of the order Ranunculaceæ because of its corolla of five separate petals and its numerous stamens; but it is seen not to be so because of the perigynous position of its stamens. Again, it appears as if it may be a Saxifrage, but its pistil of many carpels shows us

[1] Ward, Article "Psychology," *Encyc. Brit.*, p. 75.

that it is not. On a third inspection the stipulate leaves lead us to think it may belong to the Rosaceæ, and this conclusion is confirmed by a further consideration of its parts.

So in the problem, "Divide a shilling into two parts, so that one is a penny more than the other". To one ignorant of a rule for such problems sixpence and fivepence first suggest themselves; but they are rejected because added they do not make a shilling. Then, perhaps, fivepence and sevenpence occur to his mind; but these are seen not to differ by a penny. Finally sixpence halfpenny and fivepence halfpenny are thought of, which is seen to satisfy both conditions and so to end the process.

From these examples, we see that thought is a *discursive* process. The mind is not content simply to consider ideas as they arise, but it actively seeks them, selectively attending to some and instantly repressing others. This active control involves a very special and disciplined form of voluntary attention, which again implies the influences of human culture as we see them at work in a civilised community. The strain of this attention is highly characteristic of all thinking processes.

Another great difference between thought and all the processes till now spoken of is the special nature of the material which may enter into the former. In perceiving and imagining we have to do with individual things, as they can be known by way of the senses. But we can apprehend their constituent qualities, and by comparing them one with another in respect of these qualities reach *general ideas* of them. For instance, I can not only perceive this particular river, say the Thames, which flows at my feet, but I can think about the essential properties of a river, and so about rivers in general. The latter gives rise to the knowledge of the General and Abstract, as distinguished from that of the Particular and Concrete. Thinking and Understanding are often used to mark off the same higher region of intellectual activity. When we view an object, *e.g.*, a daisy or a rose, as a concrete

whole we merely *apprehend* it: when, however, we specially note certain of its characters, recognising these as the common characters of a whole class of objects, we *comprehend* it.

Again, we may mark off two kinds of thinking, answering to those distinguished under Imagination. This may be illustrated by considering the great difference in mental stress between solving a problem in algebra for oneself and reading over the solution in a key. In the one case, ideas are called up from all quarters and selection made from among them, the whole process going on under very great strain. This form of thought may be called Originative. In the other case, one merely takes in the meaning of the terms used, and gives a comparatively passive assent to the relations asserted. This Interpretative form needs much less effort. In the case of some demonstrations, even interpretative thought may grow very difficult, though even in this case the effort involved is less severe than that required for the original construction of them.

Thought and the Earlier Processes: Imagination. Abstract thinking may so develop that pains are actually taken at times to exclude perception, as for instance when one shuts one's eyes, or blocks one's ears with cotton-wool. Yet we must remember that perception, as shown in chapter viii., not only provides the foundation for all the higher processes, including thought, but in its higher form of observation contains a germ of thought.

In a previous section it was pointed out that thought and imagination actually work side by side in what is called Originative Imagination, which may almost be called "Thinking in images". But that to imagine is not the same thing as to think about generalities, is at once evident. To imagine is to represent a concrete object in something approaching to its fulness of detail: to think is to inhibit this tendency to "picture out" the object represented, to restrict attention to certain selected aspects of it. Hence

a strong vivid imagination in a child is apt to hinder clear conceptual thought. This is illustrated in the suggestive action of words on an imaginative child. Such an one instantly begins to reduce the verbal symbols to images of certain individual examples. This holds good, too, of many adults. A young lady of an imaginative turn being asked what the word "boat" called up, answered: "A rather large boat, pushing off from the shore, full of ladies and gentlemen".[1]

Psychologists are pretty equally divided nowadays as to whether thought necessarily involves some amount of imagery. Some recent writers[2] positively assert that images are not necessary. Binet has shown[3] that a sentence may be understood before images have had time to appear; also that the connection of images, when they do arise, with thought, is sometimes so casual or even contradictory that they hinder rather than aid thinking. The believers in the possibility of *imageless thought* are therefore on the increase.[4]

On the other hand, there are still psychologists, *e.g.*, Prof. Royce,[5] who maintain that all thought involves images of objects; while others are content to say that thought at least involves *words*. Since words (as will be shown later) are of such importance in connection with thought, their images, visual, auditory, or kinæsthetic[6] will certainly be important also. The chief differences in word-imagery will be dealt with in the chapter on Individual Differences.[7]

Elements of Thought-Activity: (*a*) Analysis: Ab-

[1] Galton, *Inquiries into Human Faculty*, p. 110.

[2] For example, Winch, in *Journal of Philosophy, Psychology and Scientific Method*, vol. v., p. 338.

[3] Binet, *L'Étude Expérimentelle de l'Intelligence*, chaps. vi. and vii.

[4] Karl Bühlen, in *Ueber Gedanken*, has shown experimentally that thought, for brief periods at least, needs neither images nor words.

[5] *Outlines of Psychology*, chap. vi., § 59.

[6] For some account of kinæsthetic word-images, see McDougall, *Physiological Psychology*, p. 150.

[7] Young students are reminded that the main question here considered is not whether we *can*, but whether we always *do* have images when we think.

straction. The earliest way of looking at and recognising things is by regarding them as *concrete wholes* determined or characterised by certain prominent and attractive features or qualities. In perceiving and recognising an object, say a rose, a child cannot at will single out for special attention any one of its qualities, *e.g.*, its shade of colour, or the mode of curvature of its petals. Strictly speaking he apprehends merely a *thing*.

In perceiving certain simple objects a child may, no doubt, carry out a process which looks like analysis, as when, for example, he extends the name "lamp" to various bright objects, or greets the passing of a bird with the exclamation "*Big* bird!" In these cases he must, it is evident, specially note one feature of the object, brightness or bigness. But these features may be said to force themselves upon his attention by their vigour as sensory stimuli (*intensity* or *extensity* of visual presentation). We can artificially aid a child to carry out such easy processes of comparatively isolative attention, as when we draw the form of an object in outline on a blackboard and so separate form from the other and possibly more impressive features of the object.

How much a child can apprehend of the qualities and relations of things before he comes to the use of abstract language is uncertain. Some implicit half-conscious apprehension of them there must be, to enable him to discriminate and recognise ordinary objects. Whether we should call this first mode of apprehension a *perception* of qualities and relations is doubtful.[1] Whatever may be the reach of this first so-called abstraction,[2] we must distinguish it from "abstraction" in the narrower sense, which means the singling out for special attention of a quality or a relation which, so far from protruding itself on our notice, lies hidden among a number of surrounding elements. It is this true abstraction when, for example, we separate out

[1] See Lloyd Morgan, *Psychology for Teachers* (new edition), p. 123.

[2] Meumann calls it "psychological abstraction" to distinguish it from the later and more logical abstraction (*op. cit.*, i., p. 254).

in thought the elements of form in a flower, or the proportion between two sides of a triangle or rectangle. We will now inquire how this thought-process is effected.

(*b*) **Synthesis: Comparison.** In order to understand how this separation of elements takes place, we must go back to a fact brought out in treating of suggestion by similarity (see p. 215). A particular element, *e.g.*, the rectangular form, is common to many things and so appears with dissimilar concomitant elements, *e.g.*, in a door, in a book-cover. Now this variation in the accompaniments of a quality helps to draw our attention to it. By what Prof. James calls "dissociation by varying concomitants," the common element tends to "*grow into an object of abstract contemplation by the mind*".[1]

The full explicit recognition of this constant element among varying concomitants involves *comparison*. By comparison is meant generally the direction of attention to each of two presentations or ideas in rapid succession in order to see *how they are related*. In this way, for example, I compare two pictures on the wall to see whether they are on the same horizontal line. This apprehension of relation serves afterwards to connect in our thought the compared things. Comparison, in this full sense, is probably confined to man. A germ of it occurs early in the second year, as when a child turns his glance from his nurse's face to its reflection in a glass.[2]

When we talk about comparison as constituting an essential element in thought-activity, we are referring to the two great relations which lie at the basis of all the others, *viz.*, Similarity and Difference (or Contrast)—primarily to the former, but always with some reference to the latter. It is by comparison that a child grasps simple contrasts, such as white and black, tall and short, good and bad, and so forth. In like manner it is by comparison that he explicitly grasps a relation of similarity, say between a picture

[1] *Principles of Psychology*, i., pp. 506 ff.

[2] It is very doubtful whether animals ever compare; see Stout, *Manual*, p. 471. This writer places comparison at the ideational level, *ibid.*, p. 472.

and the original, or between a mouse and a rat (*cf.* above, pp. 217 ff.).

The student must carefully distinguish this clear *explicit* awareness of similarity or contrast from the *implicit* apprehension of difference in perception. A child "discriminates" the dog from the cat long before he can compare his percepts so as to see in what respects they differ. In like manner he likens or "assimilates" one object to another, before he can compare these so as to detect the real point (or points) of similarity. The first kind of activity is on the perceptual level, the second is distinctively ideational and conceptual.

This work of comparison involves the other fundamental process in thought, *synthesis*. It does so in two ways. First of all it obviously tends to connect in our thought the several objects compared. The door, the book-cover, etc., are afterwards thought of together as embodiments or examples of the rectangular form. Here we touch on the process of classing or generalising, which will be further considered in the next chapter.

In the second place, the clear explicit detachment in thought of common elements which comparison secures allows of a new reconstructive synthesis of things, as made up of particular groupings of a number of general qualities. For the early perceptual knowledge of things there can now be substituted a conceptual knowledge. This will appear more plainly after we have considered the process of conception.

Relation of Comparison to Abstraction. These two fundamental forms of thought-activity are closely connected. As every teacher knows, a child cannot at first single out in an object any particular quality or relation, say plasticity. He must first observe a *number* of objects and have the element of plasticity brought home to his mind as a common feature in otherwise dissimilar objects. There is no clear grasp of a perceived quality as a generality without some amount of comparison of the object with others resembling it with regard to that quality.

This is perhaps one of the most important principles which psychology supplies to the educator.

While, however, a rudimentary process of comparison is thus present in all abstraction, it is no less true that all the higher and more exact comparison of things is aided by the results of previous abstraction. Thus, for example, if a child is asked to compare two lines as to their straightness, it is evident that he can only carry out the comparison by following the lead of the word "straightness," specially fixing his thought on this particular aspect. The later and more exact comparison is thus greatly aided by the results of previous abstraction, *i.e.*, that involved in acquiring the notion "straight". It is then evident that the child's way of attaining to an abstraction which is practically needed, as, say, of "straightness," is not quite the same as that of an adult in conceiving a "chemical atom". The adult may formally, and once for all, go through the processes of comparing and abstracting; but the child will start with a notion general enough for his purposes, and go through successive abstractions and comparisons, reaching at each stage an idea having so much of generality as is then necessary to him.

We may then describe the movement of thought as follows: a child begins by a vague general comparison of things, by help of which he discerns more or less clearly one or more points of likeness, and so gets a faint notion of a common quality or common qualities. After this analysis has been carried to a certain point its results enable him to compare objects more narrowly and precisely, by fixing his attention at the outset on the common aspect already reached, such as the tint of the orange or the form of the square.

Varieties of Thought-Process. The subject of thought-activity being such a wide and important one, it is necessary for purposes of exposition that it should be divided into sections to be studied separately. The traditional method has been to follow the order usual in treatises on Logic, the science which lays down laws for the proper

conduct of thinking. This method has, however, led to some confusion, since psychology deals with thinking from a standpoint different from that of logic; that, namely, of what *does* take place when one thinks, not what *ought* to take place.

Bearing this difference of standpoint well in mind, we may proceed to distinguish, as in logic, three varieties of thought-processes. First, we have the forming of general ideas or concepts such as "river," "redness," "weight," as opposed to percepts and images which are particular. Next, we have affirmations or negations into which such general ideas may enter, as, "rivers are useful". These are called judgments. Lastly comes the combination of such propositions so as to give rise to others, as, since all names are nouns, and "John" is a name, "John" is a noun. Such a combination is called reasoning.

In logic these varieties are named respectively Conception, Judgment and Reasoning, and are studied in that order. This method, however, is based on an analysis of matured thought. The varieties of thought-process named do not properly stand for successive stages in thought-development. As we shall see, a child does not necessarily form concepts before he begins to judge, or *vice-versâ;* but, generally speaking, judgment and reasoning aid in perfecting general ideas, while at the same time concepts, more or less imperfect, are necessary for most judging and reasoning.

In tracing the development of the intellect from sensation through perception, memory and imagination to thought, we have approximately followed the order of appearance, though, as pointed out in chap. iv., even here it is not intended to say that no child imagines at all till the memory has reached its utmost development, and so on. But at the stage we have now reached, we are free to go on to discuss first any one of the varieties of thought-process. We shall now proceed to a brief study of the process of Judging, as the simplest type of a

complete thought-process, considering in connection with it the importance of Language to Thought.

The Process of Judging.

Meaning of Judgment. In common life we say that a man judges when he comes to a decision about a question, as when the judge decides a matter in a court of law. This presupposes a question, room for doubt, and a more or less complicated process of weighing evidence. In psychology the term is used in a more comprehensive sense. We judge whenever we go through any mental process which ends in an affirmation or negation of something. Thus I am said to judge when I observe anything in an object, and pronounce on this, as in saying, "This flower is a rose," or "This rose has a rich perfume".

This process of judging illustrates the two fundamental elements in thought-activity, *viz.*, analysis and synthesis. It is evident that before I can think, "This stone is a flint," or "This plate is dirty," I must have analysed the whole of what is presented. In the former case I single out for special attention a group of marks in the object before my eyes, which has for me the meaning "flint"; in the latter, I selectively note the appearance of dirt and its local relation to the plate as a whole ("on the plate"). While, however, judging thus implies analysis, it still more evidently implies synthesis. To judge is clearly to discern and to mark off as a special object of thought some connecting relation. Thus in judging that the plate is dirty I specially connect dirtiness with the concrete object (this plate) presented to me, ascribing it to the object as its quality or state; and further I relate—less explicitly, perhaps—the plate to other dirty objects. All judging is thus keeping two ideas distinct as two ideas, and at the same time connecting them by help of some relation, such as similarity, or proximity in place or time.

The result of the process of judging, when properly set forth in language, is commonly called a "judgment".

Whether we can judge without putting the result into a clear verbal form is a disputed point: what is certain is that the clearer kind of discernment of relations is that which expresses itself in language, either audible or silent. The verbal form in which every result of judging admits of being expressed is a statement.

Now, such statements as a child's saying that his food is hot tell us something about the real world, or at least that portion of it which is now present to the senses. Thus to judge is to decide about a real state of things, and a judgment properly clothed in language always asserts something about the real world. That is, it implies *belief*. This applies alike to judgments about external objects and events, and to judgments about the equally real world of our impressions and feelings. Our judgments are only true when our thought relates things in accordance with their real or "objective" relations.

From this short account of the process of judging it may be seen that it is coextensive with the whole of our knowledge. Even in our everyday acts of perception we implicitly apprehend objects determined by certain qualities and relations. As soon as we analyse one of our percepts and think out any of the qualities or the spatial relations implied, we reach rudimentary judgments, *e.g.*, "This object lies in front of me, so far off, is square or round in form," etc.

Principal Conditions of Judging. It is easy to see from this account of the process of judging that it can only be carried out effectively when certain conditions are realised.

(*a*) To begin with, before we can judge we must have the requisite materials for forming a judgment. These must, it is obvious, be supplied either by our own individual experience or by what we learn from others.

The ability to judge about any matter presupposes, not only a close examination of what is presented at the moment, but careful processes of observation and of analysis in the past, and a ready reproduction of the results of these processes. One cannot decide whether this

flower is an orchid, or this stone an onyx, unless he has already carefully observed examples of the class and noted its distinguishing characters.

(*b*) In the second place, to judge is to carry out a process of reflection on given materials. This, again, involves a special effort of voluntary attention in noting this and that aspect and relation of our experience. Children are incapable of judging about most things, partly because they lack the materials, and partly because they have not the power of voluntary attention required.

This controlling action of a steady purpose to think out a matter is much more difficult when feeling and prejudice oppose us. An important element in good judging is an educated disposition to inhibit not only exciting forms of feeling, but all feeling so far as it is irrelevant and likely to warp the processes of thought. In other words, it means that we look at things with calm, unprejudiced eyes. Here, again, we see how it is that children often fail to judge rightly.

(*c*) Since to judge clearly and explicitly is to clothe one's thought in clear and suitable language, it follows that a last condition of judgment is a mastery of the verbal medium employed. Children are greatly handicapped in setting forth their thought by their imperfect mastery of language.

Language and its Development. As a mind develops it derives great aid, especially in the higher stages, from its constant communications with other minds. These take place by means of certain forms of language; and the acquisition of these greatly assists in the development of thought. So much is this the case, indeed, that one great authority has denied that there can be thought without language.[1] As a preliminary to the inquiry how language aids thought, we may briefly retrace some of the stages in its development.

[1] Max Müller, *Lectures on the Science of Language* (1864), p. 69. The opposite view is touched on by Branford, *Study of Mathematical Education*, p. 120; *cf.* W. Ament, *Die Entwickelung von Sprechen und Denken beim Kinde*, i.

Language, in its widest sense, includes all signs which convey meaning, *e.g.*, written signs, manual signs (as used, for instance, by freemasons, and by the deaf and dumb) and gesture language (as used by the Red Indian tribes in inter-communication). The last-named differs from the others in not being wholly conventional, being based on such things as abbreviated imitation of actions and expressions of emotion. Though quick and elastic within certain limits, such a language is not capable of readily finding suitable signs for highly abstract notions. Thus, though one may, by imitative gesture, represent the making of a shoe, of a tent, or of a bow, it would be very difficult to express by this medium the more abstract idea "to make".

Articulate or spoken language has, among other advantages, the important one of supplying possibilities of an almost unlimited number of easily made and easily differentiated signs. It is because of this characteristic that it enables us so easily to represent abstract notions. It is at once an efficient instrument of analysis, enabling us to single out for exclusive attention this and that aspect of a thing, and of synthesis, providing in its rapid succession of articulate movements and sounds an excellent form of embodiment for a thought as a system of closely related articulated parts. Lastly, it shares with gesture-language the prerogative of being our own active creation. In speech we carry out a series of differentiated motor adjustments, by means of which we voluntarily control the movement of thought, moulding it into a definite form.[1]

Philologists are still disputing as to the origins of language in the various races of the world. There is almost certainly a relation between these origins and the beginnings of language in the child, but there is also the great difference of "Social Heredity" (see p. 74). We go on to trace some of the stages of lingual development in the case of the child.

[1] *Cf.* Stout, *Manual*, pp. 482 ff.

First of all, the infant, like animals in general, gives audible expression to its feelings; it cries when in pain and crows when pleased. At a rather later date, it finds a pleasure in exercising its voice and lungs: sounds are repeated and the infant will babble for a long time before tiring. These are the stages of emotional expression and impulse, to be spoken of later.

The instinct of imitation now becomes more prominent, and the child will say after its nurse such words as "gee-gee" and "da-da". These are, however, at first, pronounced without associating the sounds made with the objects which they represent for us. This stage of association is reached after an interval, during which the child is able to understand more words than it can reproduce.

The first real speech comes in what have been called "sentence-words," exclamations such as "da-da" or "bow-wow," when the object is noticed as present. This form of speech may be compared with our later cries, such as "Mad dog!" or "Fire!" when the things present themselves. There is as yet no great advance beyond what certain animals are capable of. A clever parrot, for instance, may say things which are quite *à propos*.

Deliberate imitation of the words of those around leads to the using of combinations of words, such as "baby's shoes," etc. We next get sentences, not at first with the words articulated in what we consider the clear order, but rough juxtapositions of words, usually beginning, it is to be noticed, with the most interesting one, and leaving a great deal to be understood; as "Home milk" (=I want to go home and have some milk). The sentences take on more of definite structure as the child acquires the use of new words by a process of trial and error.[1]

If this be a fair account of the development of language, we should expect that its disappearance would take place in the reverse order. This is substantiated by Ribot who

[1] For accounts of the development of children's language, see *Studies of Childhood*, v.; Tracy, *Psychology of Childhood*, chap., v.; Ament, *op. cit.*, Meumann, *op. cit.*, i. pp. 257 ff.

says, "Experience teaches us that this impotence of expression attacks first words, that is to say, rational language; afterwards exclamatory phrases or interjections—what Max Müller calls emotional language; and finally, in very rare cases, gestures".[1]

The Use of Names in Thinking. Words are, as remarked above (p. 246), a valuable aid to memory. Mental images are called up to a large extent by means of language. But names are not merely useful as reminders, nor does their chief use lie in economising the labour of memory. Their main function is found in connection with the processes of thought. All the more precise and complicated thinking depends on the use of them. One great function of names in thinking is to fix the products of our thought-activity in a definite form. Thus the terms "red," "crooked," and so forth definitely mark off and register for further use the knowledge of certain definite qualities discovered by analysis. In other words, names are a device by which we can artificially isolate and keep apart the results of our analytical work. Even "proper names" subserve a similar purpose. A child in learning to name his nurse "Nana," is giving definiteness and fixity to each stage of his growing idea of the group of distinguishing characteristics which constitutes this individual.

The use of names already begins to appear in children's first imperfect employment of them. There are two ways in which a child may come to the use of language: (*a*) He may hear a name, *e.g.*, "lady," "niece," employed by others on different occasions and thus be led to note the similarities in the objects to which the name is applied, and so *understand* its meaning. When later on he comes to the use of speech he learns, by help of the imitative impulse, to reproduce the articulate sound corresponding to the name when he sees another similar object, or mentally represents one. There is probably a rudiment of true thought-activity, of comparison and analysis, in this early use of names.

[1] *Diseases of the Will*, p. 121.

(*b*) In addition to learning the use of words from others, the child spontaneously invents verbal signs, and extends the use of those supplied to him by others. Thus children in the second and third year have been observed again and again to invent a common sign for eating and eatable things.[1] Again, children a little older, after they have learnt the usual names, are wont to apply them in a new and original manner, as when the name "key" was extended by one child to all bright objects. Here, it is evident, assimilation precedes the naming: the child recognises the familiar feature of brightness in the new object, and greets its reappearance, so to speak, with the recognition-sign. The use of general names serves to hold together in a compact and well-defined form the successive results of assimilation.

Relation of Language to Judgment and Conception. It seems evident that every explicit and definite judgment implies a general idea of some degree of clearness. We cannot affirm anything of a concrete individual object, as when we say, "This is a fossil," or "This substance is transparent," without already knowing the meaning of "fossil" or of "transparency". Indeed, our judgments about individual things—the first which we form—are commonly described as applications of our concepts to new individual instances. In saying that this object is a fossil we pick out and recognise the group of characters which is decisive as to whether a thing is a fossil.

On the other hand, it must be remembered that the formation of the concept itself, just because it implies a true thought-process, involves a simple kind of judging. A child in forming the idea "heavy" has to compare heavy objects and to relate them as agreeing each with each in respect of this quality, and this clearly includes a number of simple judgments. So again, in building up the more complex concepts, such as "metal," a child has to combine or synthetise into a single whole a number

[1] For an account of children's invention of names, see *Studies of Childhood*, pp. 145 ff.

of qualities, *e.g.*, weight, hardness, metallic lustre. Now this work of combining qualities can only advance gradually as the child widens his knowledge of the properties of the object. Every such extension takes place by a process of judging, *e.g.*, "The hard bright heavy thing (metal) is also a conductor of heat". A series of simple judgments is thus necessary to the formation of a concept; and, conversely, the development and improvement of our concepts prepares for a clearer and more exact kind of judgment.

A word may be added on the relation of language to these two processes. If we concentrate our attention on the name "animal," we generally get a succession of images and associated ideas, all of which in greater or less degree form part of the meaning which the word has for us. When, however, the word forms part of a sentence, such as, "He is full of animal spirits," or "The horse is a useful domestic animal," the effect of the word on the mind is altered. The introduction of the other words modifies it so that it no longer marshals up a whole host of associations, but only that particular shade of meaning necessary to the comprehension of the sentence. Thus the parts of a sentence form a whole in such a way that the whole modifies the parts (*cf.* perceptual wholes, p. 154). As Stout puts it, "Each word . . . stands for what is called a universal or concept. . . . The universals expressed by the several words combine in a unity, each helping to determine and particularise the rest, so as to form an ideal whole."[1]

Endeavours have been made to throw light on the nature of general ideas by studying what happens in consciousness when attention is directed to certain words. Yet, although they have proved valuable in the study of Association, they have not achieved their end. They have merely emphasised the fact that the concept is a highly artificial product only reached after the formation of many

[1] *Manual*, vol. ii., p. 463.

judgments. "In actual thinking, ideas are not in consciousness alone and disjointed, but as part of a context."[1]

If the judgment is thus the earliest form of thought, the *sentence* is to be regarded as the unit of language. A word as defined in the dictionary is an artificial symbol standing for only certain general aspects of a large variety of thought-material. As it is used in our actual thinking, it takes on numerous special meanings which no dictionary can register. One phase only of the word's total meaning can be uppermost in the mind at one moment.

Early Development of Judgment. A judgment reaches its perfectly articulated form by stages of improvement. A child, when only a year old, will, as we have seen, name objects, as when he recognises a dog by pointing to the object and exclaiming, "Bow-wow!". These "recognition-signs" or "sentence-words" may be regarded as rudimentary judgments, *e.g.*, "The dog has come," "That thing is a dog". It is, however, a considerable step from this to the setting forth of the qualities of things and of the relations between things by means of the articulated system of a well-ordered sentence.

The first judgments, which occur in the second half of the second year, have to do mainly with food or other things of great practical interest to the child; *e.g.*, the early form of statement: "Ka in milk" (something nasty in milk). Towards the end of the second year the range of discernment shows a marked extension, the child coming now to observe and remark on anything new or striking in the objects that present themselves, such as the unusual size of a dog or the unusual position of a sister lying on the floor. As the observing powers grow, and the interest in things widens, the number of his judgments will increase. Further, as the discernment of relations grows finer, the form of his thought will become more precise, as when adverbs such as "very" are introduced to

[1] Ward, Art. "Psychology," *Encyc. Brit.*, p. 76.

mark off degrees of a quality, or prepositions to indicate precisely relations of time, place, agency, etc.

An important step is taken in this development of clear articulate thought when a child learns not only to affirm but to deny. The use of negative signs is greatly aided by the employment by others of *questions* requiring as they so often do, a "Yes" or "No" answer. The way in which the negative particles are first used is instructive. A child of three was in the habit of framing a statement and then appending the sign of negation thus: "N. (his name for himself) go in water—no". It was observed, further, in the case of two children, that during the third year they were apt to couple affirmative and negative statements in this fashion: "This I's cup, not mama's cup"; "This a nice bow-wow, not nasty bow-wow".[1]

The development of judging is marked by another characteristic, the growth of a more cautious and critical attitude when making assertions. Thus, the child begins to ponder before speaking so as to choose the more fitting words, and to correct himself, as well as others. He grows critical and challenges the looser applications of words by others, including adults. He begins, too, to show a certain self-restraint in judgment, inhibiting the old tendencies to wild fanciful statements and exaggerations. His growing experience enables him at this stage to fashion a rudimentary standard of what is possible and impossible, probable and improbable.[2]

Perfections of Judgment: (1) **Clearness.** The judgments of the young tend to be indistinct in a number of ways. A common cause of this indistinctness is imperfect observation, together with defective analysis of what is observed. This is apt to give rise to a vague apprehension of some relation of things, though the exact nature of this relation is not made clear to the mind.

[1] *Cf.* above, p. 246. On children's first experiments in sentence-building see *Studies of Childhood*, pp. 170 ff.; *cf.* Ament., *op. cit.*, pp. 162 ff.; Meumann, *op. cit.*, i., pp. 261 ff.

[2] *Cf.* above, pp. 267, 268.

Thus a hazy-minded boy will tell you that he has seen a flock of wild birds, but cannot say at all precisely whether they were near or far off, in what direction they were flying, and in what sort of a figure they were grouped. Again, defects of memory, by leading to indistinct reproduction, are the source of much want of clearness in judgment.

Once more, the intrusion of irrelevant feeling into the intellectual processes leads to vagueness of judgment. What we call childish exaggeration is a striking illustration of this. The emotions of wonder and fear are apt to lead a child to "pile it on," as we say, in describing what he has seen; and this exaggeration precludes the finer and more precise kind of judgment.

Vagueness of judgment is apt further to arise from a too supine mode of adopting ideas from others without seeking to make them our own by personal observation and reflection. Children, as well as uneducated adults, are specially exposed to this source of vagueness.

(2) **Accuracy of Judgment.** Again, our judgments, like our general ideas, may be accurate or inaccurate. An accurate judgment is one which corresponds to the realities which it indicates. Want of clearness in judging is very apt to lead on to inaccuracy of judgment. Statements which are not clearly understood naturally tend to be *mis*understood. The more common forms of inaccuracy in children's judgments arise from inaccurate observation, from inexact reproduction, from misapprehension due to imperfect understanding of language, and lastly from a strong wish to think—or not to think—that a thing is true.

In addition to these sources of inaccuracy, we have to recognise the imperfections and limitations of each individual's experience. Our self-made judgments are largely the outcome of our own special type of experience. A child with a loving, thoughtful mother will tend to form a very different opinion about mothers from that formed by a child who is so unfortunate as to have a hard and unsympathetic one. This narrowing influence of

individual experience has to be corrected by giving due weight to the knowledge which represents *common* human experience. That is to say, accuracy of judgment thus presupposes an interaction between the individual and the social or general intelligence.

Other Qualities of Good Judgment: Stability, Independence. In addition to clearness and accuracy, our judgments may have other perfections. So far as our statements accord with known facts, they should be adhered to—at least, till new evidence proves them untrue. In this way the good sort of judgment is persistent, contrasting with a changeful and capricious type.

At the same time we should be ready to reconsider our opinions in the light of new facts. Obstinacy of belief—in the sense of unwillingness to correct narrow and inadequate opinions—is clearly a fault. A child who recognises how narrow his field of experience really is, will maintain an attitude of reasonable docility towards others, and be ready to test his judgments by some reference to theirs. Such openness of mind, however, does not mean that the child is to cease to form his own judgments and supinely to accept those of others instead.

Educational Control of Thought.

Exercising Children in Judging. The highest aim in intellectual education is to develop readiness and precision in carrying out the processes of thought. The value of a person's education can be best tested by a reference to these qualities.

Exercises in judging begin in close connection with those in the observation of things, and in the simple forms of comparison and classification which grow out of observation. A child, after observing and comparing the size and shape of objects, their situations and so forth, should be led to express the results of his mental work in suitable and precise language. This process of thought growing out of observation has been called " observation with refer-

ence to apperceptive categories".[1] In this way the child will be best trained to form the habit of throwing his thoughts into a definite articulate form.

Another simple exercise of judgment connects itself with the use of memory. Children should be questioned as to what they have observed in the past, and what they have learned from others, so that clear ideas of the relations of things may be permanently retained in a fitting verbal form.

Throughout this branch of training the educator should keep his eye on those tendencies which lead children to distort the real relations of things under the influence of preconception, and especially of bias. As Prof. Faraday remarks about a later stage of development: "That part of self-education which consists in teaching the mind to resist its desires and inclinations, until they are proved to be right, is the most important of all".

In each of these exercises a good deal of attention will need to be paid by the instructor to an accurate use of words. It is a noteworthy fact that the first period of school-instruction acts rather injuriously than beneficially on children's language, statistics of their verbal errors showing that more children commit them at the end of the first school-year than at the beginning.[2] In serious instruction children should be exercised, by means of a little cross-questioning now and again, in thinking well on the meaning of words, both those introduced by the teacher and those employed by themselves.

Freedom and Control in Training Judgment. A specially difficult problem here is that of hitting the happy mean between Interpretative and Originative Thought—between demanding too much in the way of deference to authority and allowing too much liberty to immature individual opinion. This problem presses more and more on the teacher as his pupil grows in intelligence. One point is

[1] Meumann, *op. cit.*, ii., p. 186, where the exercise of a child in this classifying of the object observed is treated as a part of object-teaching. (Anschauungsunterricht).

[2] Meumann, *op. cit.*, i., p. 268.

pretty obvious: since we want to develop the capability of independent thinking, we should encourage children to realise the truth of what we tell them by help of their own experience-material and their own processes of thought.

It is probably still more obvious to parents and teachers that with respect to certain matters the child's liberty of judging must be kept within limits. It would not do, for example, to allow him, were he bold enough, to question the facts of history. Yet, even here it might be well sometimes to meet the fiercer kind of childish scepticism, not by a hard dogmatic statement, "It is written," but by unfolding something of the painstaking line of study by which men have satisfied themselves about the truth of historical statements. We are all agreed, too, that it would never do to permit children with their limited experience to decide what it is possible or desirable to do in situations of great complexity; still less to allow them (as they are sometimes inclined to do) to pronounce on the rightness or wrongness of complex actions. To reconcile the claims of authority and of individuality in this matter of judging requires much wisdom and skill in the trainer of the young, and an intimate knowledge of the individual child as precociously self-reliant or, on the other hand, as wanting in self-reliance.

As experience widens and intelligence develops, greater scope should be given to the child for forming his own judgments. He should, little by little, be encouraged to think out a question and decide for himself. For example, he may be encouraged in certain cases—carefully selected by the educator—to judge as to what it is best for him to do, with what occupations he shall fill up his leisure hours. And, while judgment is thus developing on its practical side, it should be allowed to exercise itself more freely on the æsthetic side with respect to what is beautiful in natural objects, as well as in art, including literature; also on the logical or scientific side with respect to what is true or probable. A fuller exercise of the individual judgment about ethical matters belongs to a distinctly later period, and presupposes mature experience and reflective power.

CHAPTER XIII.

THOUGHT-ACTIVITY (*continued*): CONCEPTION.

In the last chapter we considered a complete act of thought as illustrated in judgment. Names (together with the concepts embodied in them), when viewed singly, as in a dictionary, do not represent complete thought-processes, but stand at once for products of past thought-processes, and for materials of further thought-processes. The separate consideration of them falls, therefore, rather to logic than to psychology. Nevertheless, they have so great a practical importance, both as goals and as starting-points of thought-activity, that we shall devote the present chapter to an account of their structure and origin.

The General Idea and the Image. A concept, such as "man," "organism," is clearly a *general idea*. Such an idea is best marked off as one to which we attach a special kind of meaning, namely, a general reference. Thus a child has a general idea of "house" when he knowingly uses the name as one of general scope, as being applicable to anything and everything which has certain recognisable features or qualities. As we may infer from this example, a general idea is closely connected with the use of a name or other general sign. If we had no general signs, we should have no precise and stable general ideas.

As pointed out in the last chapter, the general idea is related to the image. Let the reader try to notice what arises in his mind on hearing a single word, such as "dog". He will probably find that his mind takes up a

waiting attitude for a while in order to get more detail, such as a "big white" dog. But since no such further detail is forthcoming—the dog remaining of unknown colour, size, etc.—the mental picture called up in his mind is shadowy. Now let him try to go through the same process with a term of wider scope, *e.g.*, "animal". In this case the mental picture is reduced to something wholly vague and indefinable; because, the class being more extensive, the differences between its individual members will be greater. The typical "animal" has a size anywhere, say, between a mouse and an elephant, and it varies indefinitely in form of structure. If we continue the series, "dog," "animal," to a yet wider term, such as "thing," it is evident that we must arrive by-and-by at a stage where, if we get an image at all, it cannot represent the idea signified, but only serve as a mere appendage to it, as in the illustration already given from Sir F. Galton[1] (see p. 284, *cf.* below, Note A).

While we thus distinguish sharply the general idea from the image, we must remember that concrete images tend, by variations of experience and by the disappearance of details, to take on a general look. My image of a cathedral seen again and again, and of one seen long ago in France or Italy, is a kind of incomplete image-scheme which would do for other cathedrals as well.[2]

Generic Images. A generic image is a pictorial mental image, more or less distinct, formed by a succession of strikingly similar presentations and acts of recognition. Thus, after seeing the mother or the nurse, again and again under different circumstances, in different attitudes and, what is more important, in different clothes, a child forms a composite image of her.[3] In this composite image, the constant, regularly recurring features

[1] Compare Sara E. Wilke, *The Place of the Story in Early Education*, pp. 116 ff.

[2] See Ribot, *The Evolution of General Ideas*, chap. i.

[3] Sir F. Galton's comparison of the generic image with a composite photograph will at once explain itself to the student.

are brought into prominence by successive acts of assimilation, whilst the differences are obliterated, and further, the common features are marked off by the use of the same name (*e.g.*, "Mamma," "Nana"). This name becomes definitely associated with the composite image, so that when the mother says "Nana" the sound calls up in the child's mind a pictorial representation of the nurse's general appearance. Such a representation may be called the composite image of an individual. The mental process is essentially the same when a generic image is formed out of presentations of a number of similar objects. For example, a child sees at different times this, that, and the other dog. The features in each new presentation (constituting the general appearance of a dog) are here, too, specially selected for attention, and so impressed on the mind in the successive acts of assimilation. Here, again, one and the same verbal sign, a general name, is used in recognising each new presentation in the series (*e.g.* "Bow-wow"). In this way there comes to be definitely associated with this verbal sign a generic or typical image of the common form of the dog.

Such generic images do not, however, in themselves amount to true general *idea*. A child understands and even uses general verbal signs, such as "man," "dog," before he grows aware of a general reference implied.

The General Idea Proper. We only have a true general idea when we use a name (or other sign) with an awareness of its general function or meaning, as applicable to any one of an indefinite number of objects which have in common such and such qualities. This indefinite range of application is of the essence of the meaning of general signs. Now some inkling of a general scope or reference may be obtained without using general signs. The image of an individual object may function as a typical example of a class or group of qualities. When, for example, a schoolmaster has occasion to think of the desirable sort of boy for a post of trust, he need not think out explicitly this, that and the other qualification: it is enough to

image "John Smith," the image having, as a sort of penumbra, a dim "fringe of meaning," namely, the kind of *morale* or character needed. A generic image gets more readily transformed into such a general symbol, since common aspects and qualities have already become accentuated by the obliteration of differences.[1]

The more explicit and definable kind of general idea implies a certain amount of reflective comparison and analysis carried out upon generic images. Thus a child begins to seize the general meaning of the sign "bird" when he goes back in reflection on his past observations, not entirely neglecting the differences between this and that example, though specially attending to the points of likeness. By a similar process he comes to have a clearer idea of an individual as such. He has made a step in advance of the baby who uses "da-da" as a recognition sign for all bearded men.

Concurrently with this, and in close connection with it, the child notes by further comparison and analysis the *general*, as distinguished from the individual, characteristics, such as the distinctive physiognomy, dress, pitch of voice, etc., of the various members of the class which we should call "adult human male". When this process is complete he is said to *generalise, i.e.*, to apprehend certain aspects of things as common to many. He is now in a position to understand what is called a *class*.

Formation of More Abstract Notions. The use of the general verbal forms considered so far, for instance, "cat," "bright," and modes of action, such as run, jump, etc. involves, as we have seen, but little thought-activity. The general idea largely forms itself, by help of comparatively simple and mechanical processes of assimilation, aided by the differentiating or limit-setting use of a name. This comparatively passive process may be carried out in all cases where the similarity in its extent and its impressiveness clearly preponderates over the dissimilarity.

[1] *Cf.* J. R. Angell, *Psychology*, pp. 210 ff.

It is otherwise when a child is called on to carry the process of abstraction to a further stage, and to separate out points of similarity running through a larger variety of objects, and much more hidden by surrounding differences, as in forming an idea of *animal*. In this case he needs to *think*, in the stricter sense of the word, to recall and compare many presentations, and by a strenuous effort of concentration to fix his mind on the common features.

A special effort of abstraction is involved, further, in singling out for special consideration some *single quality* in an object, as when a child begins to call his ball or his hoop "round," and, more ambitiously, to talk of roundness. The use of this more abstract language follows that of the more concrete. Children have but few adjectives in their first vocabularies,[1] and these are probably used as the equivalent of concrete names, while abstract names, such as "roundness," appear much later still. It is by the finer, more detailed analysis of qualities which the more abstract language makes possible, that conceptual knowledge becomes perfectly definite. Thus, it is only later when the boy can separately think out the several qualities of water, *e.g.*, that it yields to the hand, that its parts do not hold together, etc., that his knowledge of this substance acquires a perfectly precise form (*cf* above, p. 186).

The Concept as a New Synthesis: Mathematical Ideas. So far, we have been viewing the concept as the result of analysing out qualities and relations from presented groups. But we cannot understand the way in which thought-activity proceeds without referring to another process, *viz.*, the synthetic combination of the several qualities and relations isolated by analysis.

Children, we must remember, learn the qualities of things gradually. They know milk as the white-sweet thing before they know it as a liquid, and they know it as liquid long before they know anything of its chemical

[1] See Note B.

composition. We see, then, that as new observation and study discover new qualities in a thing, these are synthetically incorporated into the concept of it. Of course many of these gradually-added qualities are acquired from the experience and the teaching of others. A child's later "concept" of a star is almost entirely built up of what others tell him about the object.

There is another way, too, in which a synthetic bringing together of attributes enters into the process of conception, *viz.*, whenever we are called on to form new general ideas by a constructive rearrangement of ideal material. This is illustrated in many school studies, such as history, in which the learner has to build up out of the results of his own previous observations and generalisations such ideas as "king," "invasion," "law". This process of conceptual synthesis is carried out in close dependence on an act of constructive imagination. By it the mind of the learner fashions an image, say, of King Alfred, or of the landing of the Romans in England, and this image supplies a kind of material basis for the concept.

In a certain class of cases this preparatory work of imagination is wanting: the concept transcends the limits of distinct visual representation. This is illustrated in the formation of ideas of objects of great magnitude and of large quantities, such as the earth, a hundred miles. A child's first ideas of quantity, say, the length of a yard, or the number 5, are based on sense-perception; for a yard *looks* different from a foot, and five things look different from four things. Yet even in these cases a process of analysis and of synthesis is necessary to the formation of clear notions: the yard, for example, has to be broken up into 3 feet, and then reconstructed by adding foot to foot. In the case of the greater quantities, as a mile, or the number 1000, the perceptual basis fails altogether, and the process of synthetic addition or summation supplies the whole meaning[1] of the idea.

[1] For exceptional cases, see Galton, *Inquiries into Human Faculty*, pp. 79 ff

In a somewhat different way this synthetic activity is illustrated in forming the notions of geometry. Our first mathematical teachers proudly insisted on the truth that the line and circle of geometry transcend actual forms; the lines drawn with the most delicate instruments—not to speak of those drawn with chalk on the blackboard—have thickness, and so are not perfect mathematical lines; are, moreover, far from being perfectly straight in the mathematical sense. It follows that such geometric ideas are not the mere result of an analysis of percepts, but involve a step further away from concrete sense-experience, namely *idealisation*, or ideal perfecting. Hence the peculiar difficulty which some beginners in the science experience in attaching any reality and meaning to these forms; and hence, too, the peculiar and half-poetic charm of the science for others.

The mathematical ideas just considered take us some way from sense-experience and the knowledge of material things. There are other general ideas which have to do with experiences still further removed from the senses, with the region of mind or of "inner" experience. Such are "perception," "emotion," "shrewd observer," "profound thinker," "moral integrity," and a host of others. One of these ideas has a special prominence in our experience, accompanying, in a more or less distinct form, all our conscious activities, namely, the idea or notion of *Self*. It has already been touched upon (see especially p. 165), and we must now make a closer inspection of it.

The Idea of Self.

Early Development of Idea of Self. According to Oliver Wendell Holmes, a man has three selves: (1) the real self, known only to his Maker; (2) what he takes himself to be; and (3) the self his friends take him to be.[1]

[1] *Autocrat of the Breakfast Table*, iii. Holmes views the third as some one friend's idea—"Thomas's ideal John".

The psychologist, though he may recognise more selves than these, considers the first of the three as outside his scope.

In our short account of self as an image we found that our first ideas of self arise out of perception of the body, and the sensations and concomitant pains and pleasures which associate themselves with the body. Traces of this origin survive in adult speech, as when we say "I have cut myself".[1] We saw, too, that it is from this bodily reference that we first get an idea of self as persistent and continuous. In treating of perception, moreover, we touched on the distinction between self and external things, the not-self. We must now inquire how this not-self is differentiated.

For the child the environment may be said to consist of two classes of objects, the inanimate and the personal. He finds that these react differently to his needs. "The baby may stretch his hand towards his rattle, but if it is not within reach, it does not move towards him and place itself in his hand of its own accord, however much he may cry. But if the nurse is present she may bring it to him. Her action thus fits into his as its continuation and completion."[2] Such is the beginning of a process which, aided by language, leads to the development of an idea of *personality*.

According to Baldwin,[3] the beginnings of this differentiation may be noticed in children as early as the second month, this constituting the first stage in the development of the idea of Personality. A second stage is reached when the child begins to notice that while some things act always in the same way—a ball for example being always hard, or always soft—other things (persons) exhibit irregularity in their mode of behaviour—a mother sometimes picking up the child and sometimes not doing so. At the next stage, the child begins to discern amid this irregularity a certain regularity: the mother acting differently from the father, and the child himself learning to behave

[1] Stout, *Manual*, p. 520.
[2] Stout, *Groundwork*, pp. 171.
[3] Baldwin's *Story of the Mind*, pp. 95 ff.

differently according as he is in the presence of the one or of the other. From this differentiation comes the first dim idea of *personal character*.

Thus far the child's idea of self is called by Baldwin "projective," because the persons, as known to the child, are merely one class of external objects. As, however, he begins to imitate the actions of these persons, he lives over for himself the experiences through which he may suppose them to have passed. Thus, when he throws a ball, imitating another's throw, he obtains insight into the mental experience of the first thrower. What he saw done "is now no longer 'projective'—simply there, outside, in the environment: it has become what we call 'subjective'".[1] The child now not only thinks, feels, etc., but knows explicitly that he does so.

As soon as this activity of mind appears to be of more importance than that of the body (which now comes to be looked on as a tool), the child reaches that stage in the development of the self-idea which may be called that of the "inner self"; though even now, as we have seen above, the idea of self does not shake itself entirely free from the bodily element. The idea of self and that of other selves develop together. The child's ideas of other minds are based on what he finds in his own. Other selves thus built up are spoken of by Baldwin as "ejective".[2] Evidently this constructive process will proceed much more rapidly when language has developed into an efficient instrument of social intercourse. Conversely, the influence of others' words and behaviour is an important factor in the growth of the fuller idea of self. This influence is at work throughout the whole period of education. It is the constant appreciation of his ideas and actions by the mother, as when she says "That's silly," "This is nicely done," which most powerfully acts upon

[1] Baldwin, *Story of the Mind*, p. 104.

[2] Baldwin's account of the growth of self-consciousness in *The Story of the Mind* should be compared with the earlier account in *Social and Ethical Interpretations in Mental Development*; bk. i., pt. i., chaps. i. and ii.

the early growth of self-consciousness. Indeed, in the case of all of us, the influence of our social surroundings on our idea and estimate of self is a considerable one.

We have now arrived at a point where the child develops an idea of himself as a distinct personality with a more or less distinctly defined group of intellectual and moral capabilities. He will now have come to know himself by name, and to speak of himself in the first person. As memory develops he will begin to go back on his past experiences, and to realise his continued existence as one and the same self.

Mutations of the Self. Whatever it be which constitutes the permanent, unchanging element in self, the self we know—or "the empirical self"—changes. As we grow mentally and morally, and develop new interests and aims, we ourselves alter, and our ideas of self must follow the change at a distance, at least. The self is, indeed, continuously and gradually altering, adding new elements and shedding old ones which are no longer needed. A great change of circumstances and mode of life is attended with a consciousness of a greatly altered self.

These expansions and contractions of the self are closely related to our varying social attitudes, more particularly those towards our superiors and inferiors: for example, that of an assistant master towards his "head," on the one hand, and towards the average member of his form. These differences of social relation and attitude have as their concomitants an elevation and a depression of the self-feeling, to be spoken of later. Since, as we advance in social position, our relations with our fellows vary, the attitude of the self towards one and the same person will vary. The dons, the senior students, etc., who to the freshman appeared depressingly great, if not terrible, lose much of their oppressive dignity for the second-year "man," some of them, perhaps, becoming objects of good-natured contempt. This transition from the attitude of oppressive inferiority to one of equality or

superiority goes on, in the case of fairly successful persons at any rate, through the whole of life, whether spent in the shop, at the bench, or elsewhere.

But it is not only in this regular and more gradual way that our idea of self is altered. Every new and sincere friendship tends to enlarge the idea. Such considerable extensions of interest and activity as are involved in setting up a home and bringing up a family are attended with a profound modification of self-consciousness, while the loss of wife or child is felt as a mutilation of the self. Great turning-points or crises in life, *e.g.*, moral or religious conversion, which we are apt to speak of as the beginnings of a new life, may, from our present point of view, be described as the beginning of a new self. It was in reference to such changes that Tennyson wrote—

> Men may rise on stepping-stones
> Of their dead selves to higher things.

Such profound changes in self-consciousness, involving transformations of the idea of self, may well appear to contradict our belief in the persistence of one and the same self, in what is known as personal identity. We are reminded by them of the old oil-lamp, which was successively supplied with a new burner, a new support, and a new vessel, nothing remaining unchanged except the lamp itself, as viewed by its possessor. In the case of the self, too, continuity and identity appear to us to remain in spite of ruptures of the continuity of our consciousness, *e.g.*, during a dreamless sleep; in spite, too, of the loss of the older selves and the substitution of newer ones. This obstinate belief is rooted in memory, which, though limited in its backward reach, brings back now and again fragments of the old experiences, feelings, etc. Special circumstances, *e.g.*, the sight of a boys' cricket match, to one who keeps young, like George Meredith, may occasionally bring a more vivid revival of one of the remoter selves. But it is only in exceptional mental states, such as dreaming, and in abnormal states involving

"alternations of personality,"[1] that we can speak of a considerable reinstatement of the vanished selves.

The Self as Composite and United. If we keep to the metaphorical view of consciousness as a stream, we may illustrate the position of the recognised self in it by the rude analogy of a buoy fixed in the current. It is sometimes almost completely submerged, but seldom or never wholly hidden, disclosing, as it rolls about, now one side, now another, and occasionally coming into view for a brief interval almost in its completeness.

A normal man, who has, say, his business or profession, his family, his church, his political club, and a favourite recreation or hobby, must have at least half a dozen such facets or partial selves, which are more or less independent one of the other. To each of these there would correspond an extensive apperceptive system—ideas and judgments which have become organised into a distinct mode of thinking, feeling and behaving.

These partial selves, or sub-selves, may not only thus appear separately in response to distinct environments and situations, but may preserve so large a measure of detachment that a man may, as he asserts this or that side of the self, be a different *moral* person, and yet be untroubled by any sense of inconsistency, like Mr. Wemmick in Dickens' *Great Expectations* with his "official sentiments" and "Walworth sentiments". In certain cases, however, they may present themselves together and come into competition and conflict, as when the more private, home-loving self is opposed to the larger social self. When such conflict arises, the person may have to choose among the several selves. He has to decide with which of the conflicting selves he will identify himself. Such conflicts and deliberate preferences of one self to another play an important part in the development of an *ideal* self.

These separate partial selves are all co-ordinated in the Total Self, which is perhaps best represented by the self

[1] For a description of these states, see W. James, *Principles of Psychology*, i., pp. 373-400.

of action. This active self, as we shall see, has its systematised group of ends, each end, together with the corresponding motive, being itself a systematised group of conative impulses, *e.g.*, towards knowledge or social recognition. In the great decisions of life, required at its momentous crises, such as deciding on a particular professional career, there is something approximating to a reinstatement of the total self.[1]

Other Concepts: Practical Aspect of Concepts. The other varieties of concept touched on may be dismissed with a word or two. An interesting group consists of *ideas of value*, as illustrated in our æsthetic and ethical concepts, for example, "beautiful," "charming," "good," "praiseworthy". The chief distinguishing characteristic of these is that they are rooted in experiences of feeling. Whatever other meaning the metaphysician may ascribe to "beauty" and "goodness," they are for our experience ideas of aspects of objects which appeal to feeling, *e.g.*, æsthetic delight, moral approval. This side of our æsthetic and moral experience will be brought out in chapter xvii.

A point of special interest in a theory of general ideas is their *practical aspect*. Many of our notions have an unmistakable practical reference, that is to say, are built up on, and refer back to, active, rather than perceptual, processes. These include not only ideas representing systematised groups of actions and rules of actions, *e.g.*, "cycling," "medical skill," but groups of objects viewed in relation to practical needs and tendencies, such as "food," "medicine," "weed" (as distinguished from plant), "tool".

How far, it may be asked, does this practical aspect extend? If all general ideas are based on percepts, and percepts commonly tend to induce motor reactions, may it not be that general ideas, for the most part, have also

[1] The student may further consult, on the development on the idea of self, W. James, *Psychology*, chap. xii.; Stout, *Manual*, bk. iv., chap. vii.; Lloyd Morgan, *Psychology for Teachers*, chap. vi.; C. H. Judd, *Psychology: General Introduction*, chap. xii.; and *Studies of Childhood*, pp. 109 ff.

some reactive tendency, and so a practical side? "Our general ideas," writes Prof. Royce, "whether exact or inexact, stand for certain mental attitudes assumed towards any object of the class of which we have the general idea."[1] That is to say, in their application (denotation) general names involve some special attitude. This is certainly true of some terms, as we may see in the series "wine," "medicine," "poison". Such attitudes may be mainly affective, the tendency to accept the pleasant and reject the unpleasant; or more distinctly practical, as illustrated in the semi-conscious impulse to *use* the knife, the whip, etc., in the appropriate way. It might, perhaps, be said that in the concepts just illustrated the reactive tendency constitutes a fringe of the meaning of the word. Yet in dealing with concepts as intellectual products we have, for the most part, to ignore these attitudes, because (if for no other reason) they are largely variable and accidental, as may be seen by comparing the reactions called forth by "fruit," or by "mosquito," in the spring and in the autumn. The concepts "gold" and "food," as employed in scientific thought, are cold, dispassionate things. We cannot easily conceive of any hungry economist doing full scientific justice to the concept "food".[2]

Rudiments of the General Idea. Children are sometimes said to have general ideas and to abstract; but, as we have seen, this is an error. True abstraction, that is, the apprehension of a quality *as such*, comes normally only after some use in language.

The early stages of generalisation as reflected in children's language have already been touched on. We may now try to determine more precisely the course of development of general ideas in early life.

We may roughly mark off three stages of lingual progress answering to successive advances in the employment of general signs. (1) In the first stage we have simple

[1] *Outlines of Psychology*, p. 288.

[2] The relation of thought to action will be dealt with again in the next chapter.

recognition-signs which are used for greeting the appearance of something familiar, or resembling things already familiar, such as "bow-wow" "ka-ka" (dirt) etc. This perceptual or apperceptual recognition involves nothing in the shape of a free idea or image. It shows, however, a tendency mentally to detach certain elements and to broaden out the scope of application, as when a verbal sign is applied "analogically" to other things than the one to which it was first applied, *e.g.*, "barking," to the crackling of the fire, "star" to any bright object. Yet, at this stage, there is probably no discrimination of one thing from a number. The signs used are as little *individual* as they are *general*. As Ament puts it, they "form a genetic transitional stage".[1]

(2) In the second stage, in which a child understands another person's use of a general name, or himself uses it when no object is present, we have to assume the formation of a generic image. When a small boy who possesses a little nursery library, calls, in his quiet tone of kingly authority for "book" we may suppose that he has begun to form a free generic image of book. The verbal sign helps him to get such an image—a possession which probably lies out of the reach of animals. (3) At the final stage, we have general ideas properly so called, which, though greatly aided by the passive mechanical process of accentuating similar elements and effacing dissimilar ones already explained, involve a measure of comparison of different experiences and objects.[2]

The first quasi-general ideas formed by the child correspond to narrow or "concrete" classes, having striking points of resemblance. This may easily be seen by studying the vocabulary of a child of four. He uses the names milk, water, tea, etc., but has no name for something to drink in general. In like manner he uses the name

[1] *Die Entwickelung von Sprechen u. Denken beim Kinde*, pp. 145 ff.

[2] On the early stages of generalisation see Preyer, *The Senses and Intellect*, chap. xvi.; Ribot, *The Evolution of General Ideas*, section ii.; Ament, *op. cit.*, "Wortbedeutung," ii. ff.; and Winch, *Problems in Education*, chap. iv. pp. 50 f.

"house," but not "building"; "apple," but not "fruit"; "doll," "gee-gee," but not "toy". Herein his language resembles that of savages. In certain cases, however, a child (again resembling the savage) will appropriate the name of a larger class, before he employs that of one of the sub-divisions, *e.g.*, "tree," before "oak," "elm," etc., since here the differentiating group of resemblances is more obvious in the larger class than in the sub-classes.

As in the case of early judgments, so in that of the first general ideas. The special directions of mental activity are determined by predominant interest. Thus the lead of practical interest is shown in the use of "milk" and of "dolly". Æsthetic interest, too, plays a considerable part in the formation of the first general ideas, as is seen in the acquisition of such names as "flower" and "picture".

Some of this early generalisation follows, not our familiar distinctions as fixed in common language, but lines of childish interest and thought. This is seen in some of the extensions of names by children to analogous presentations, as when the crackling of the fire is apperceived as a kind of "barking". In these cases genuine movements of thought in the direction of class-ideas may go beyond the generalisations fixed in our conventional speech. The same applies to original inventions such as "dig" for a hole dug in the ground, "rainer" for a person who sends rain.[1]

Differentiation of Language-signs. The advance of the child's thought in respect of precision of concept is seen in the gradual appropriation of different kinds of words. At first a child uses words neither as substantives nor as adjectives, etc. (see Note B). His verbal signs, like his ideas, are "general" in the sense of being undifferentiated. Thus "doll" may mean, "Where is dolly?" "Dolly has fallen," and so forth. Little by little the child distinguishes the functions of words, and comes to use the names of things and actions as such. A noteworthy event in this linguistic progress is the first use of adjectives. A

[1] The student should here look at the early vocabularies of children as given by Tracy, *op. cit.*, chap. v., and Ament, *op. cit.*, pp. 77 ff.

child of two may pick up and use a few adjectives, such as "hot" and "nice," which answer to simple sensations of very great interest to him; yet these are probably used as names, "nice," for example, meaning "nice thing". A more difficult achievement is seizing the meaning of a relative term such as "big"; first used by one child, with reference to a rook ("big bird"), at the age of twenty-two months.

Among the more abstract conceptions reached in the first years of life, those of number and time deserve a passing notice. Preyer says that his boy in his twenty-sixth month had not the remotest idea of number. Another boy, when twenty-two months old, distinguished one object from a *plurality of objects*, and some time before he could distinguish two from three, and so on. He called any number of objects (except one) "two, three, four," according to the formula taught him by his mother. When three and a half years old, the same child still confused number with size (Note C).

In like manner, it is common for children to mark off all periods of the past under the head of "yesterday," and all periods of the future under the head of "to-morrow" or "by and by". A considerable improvement of thought-activity is necessary before they can pass from this rough discrimination of one and many to the discernment of particular numbers, and from a mere discrimination between past and future to the discernment of definite divisions of time, as yesterday, to-morrow, last week, next week.[1]

From about the twelfth year onwards we notice in the case of children undergoing instruction a marked progress in the use of "abstract language". They begin to assimilate and make use of the abstractions which enter into the language of their cultivated elders. Thus they talk of "heat," "strength," "shape," and even of such subtle abstractions as "the future," "belief," "fairness," and so

[1] The student will find a fuller account of children's early thought-activity in *Studies of Childhood*, chaps. iii., iv. and v.

forth. Such abstract language, however, probably remains for a considerable time only very imperfectly understood, as well as highly pictorial in its import.

Regulation of Conception.

Psychological Idea and Logical Concept. In a work on psychology it is well to say as little as possible about the logical treatment of Thought, since this has in the past tended to confuse the psychological treatment, and should, therefore, in these days be carefully excluded from it. Since, however, this is also a book which has a practical side, a bare reference to one or two logical distinctions seems to be desirable.

In its proper logical sense, a "concept" is a clearly thought out general idea, so that all that is implied in it is explicitly apprehended and clearly set forth in words. It signifies, further, that the idea called up by the word in the mind of A, B, or other individual is accurately adjusted to the commonly recognised meaning of the term among competent and educated people. In other words, a concept is an *ideal*, a perfected form of our actual ideas.

This accurate adjustment of an individual's general ideas to the conceptual standard includes two things: (1) as the result of mental analysis he must represent the precise group of qualities which are "essential," or, in other words, which are specifically marked off as the *meaning* or *connotation* of the term. Thus we think the concept "metal" with logical correctness when we distinctly represent those common and fundamental attributes, such as being an element, a good conductor of heat, and so forth, which scientific men agree should form the meaning or "connotation" of the word; (2) as a consequence of this adjustment, the name must be used with its correct *application* or *denotation*, that is must be applied to all, and only to, those objects which possess the qualities implied by the name. Thus "metal" must be applied to liquid mercury as well as to the solid iron, and it must not

be applied to things which are not, properly speaking, metals, such as stones.

Imperfection of Concepts: (*a*) Want of Distinctness. Now, the general ideas of children, and indeed of most adults, are far from having this logical perfection. To begin with, they are apt to be *indistinct*, wanting in a precise apprehension of the several qualities and relations implied. As we have seen, children's general ideas begin by being pictorial images ("generic images"), which, like the first form of the percept, are apprehensions of *wholes*, in which the constituent parts, qualities and relations are not distinctly separated one from the other. In this way a child of four or six uses the names "dog," "house," "flower," and the rest. He may be able to get as far as to say, "A flower is a pretty thing growing on a bush": but he has no idea of the parts of a flower and of their arrangements, as a botanist has.

In the case of children a further and prolific source of indistinctness or vagueness is *defective comprehension of the meaning of words as used by others*. The fact that a child is daily hearing a highly developed language, in which the finer distinctions and the more subtle generalisations of the mature intelligence are embodied, leads to a good deal of vague apprehension of meanings. A child will often be puzzled to know what an educated adult understands exactly by such terms as "lady," "a fine character".

Even when the process of analysis described above has been carried out, and the idea has been developed into a conceptual form, it may *become* indistinct. This arises from the peculiar structure of the concept. As we have seen, this is a general idea, in which, by help of the name, attention is kept focussed, so to say, on certain special features of the object represented. If we lose our mental hold on these, our concept will fall back into its original indistinctness. The same of course applies to the concepts reached wholly by way of instruction, such as "watershed," "rectangle," "transitive verb."

Although we may distinguish between the meaning of a general name and its application, it is easy to see that they are closely connected. As has been conceded above, a child may be able up to a certain point to recognise an object and apply the corresponding name correctly without having a distinct apprehension of the several determining qualities. Yet in difficult cases, where an object lies, so to say, on the margin of the class, only a distinct grasp of the qualities which make a thing, a house, a flower, or what not, will suffice for identification. Thus a child who had no distinct idea of the qualities which constitute a house would not be sure whether a barn was to be called one. We may say then that it is only a full and correct analysis of the meaning of a name which enables us to apply it accurately in all cases.

(*b*) **Want of Accuracy.** From the mere indistinctness of a concept we have to distinguish its positive *inaccuracy*. The distinctness of a concept depends on our representing the characteristic group of qualities in its difference from the groups of other co-ordinate concepts: its accuracy depends on our taking up the right elements, *i.e.*, the common and essential characters of the class as recognised by others, no more and no less. Thus a correct notion of "rectangle" should definitely include the presence of four right-angles, and should *not* include equality of the four sides.

It follows from the relation of the meaning of a name to its application that inaccuracy in meaning leads to inaccuracy in application. Thus a child who thought that a metal is always and necessarily a solid body would err by not recognising mercury (quicksilver) as a metal.

The fault of comprehending too much in the meaning of a concept is very common, and grows out of insufficient range of observation. For example, a child who has only seen red roses is apt to regard what we call the accidental quality of redness as a part of the meaning of "rose". The opposite fault, excessive width of application, comes, not from an insufficient range and variety of observation, but from imperfect examination of what is

before us. If our observation is superficial and hasty we shall detect and mark off only a part of the common traits or characteristics, *viz.*, those which are especially prominent and impressive. The notions of children and of the uneducated are apt from this cause to be too wide. For instance, they observe among different creatures called "fish" the conspicuous circumstance that they live in water; and, knowing nothing of the differences of structure and habits of life between a fish and a mammal, they tend to make this circumstance the whole meaning of the word and so to call a porpoise or seal a "fish".

Our concepts tend still further to become inaccurate, just as they become indistinct, by the lapse of time and the gradual dropping out of some of their elements. Waitz instances the tendency of a boy, even after the definition of an angle has been given him, to fall back into an erroneous first conception that the *length of the sides* helps to determine its size.[1]

The two imperfections of concepts thus distinguished, indistinctness and inaccuracy, are closely related. When our ideas of things are hazy, and there is no clear grasp of the determining qualities, there is a peculiar danger of dropping essential elements altogether, and, further, of taking up extraneous and accidental ones.

Relations of Concepts. In order to have clear concepts, and to think clearly about things, we must become explicitly aware of their differences as well as of their resemblances. The difference between "man" and "brute"—which is an element of our "*marginal* consciousness" when we are thinking about "man"—requires to be made "*focal*" if we would know clearly what man is and is not. This full comparison and explicit discrimination becomes especially important in the case of all concepts which, from their similarity, are apt to be confused, especially by children; such as "strong" and "healthy," "sensible" and "clever".

[1] *Allgem. Pädagogik*, § 21.

An orderly systematic review of the agreements and the differences among things is what is known as *logical classification*. To classify things is to view them in such a way that the several degrees of resemblance and difference between them may be clearly exhibited. This may take place by proceeding through a series of generalisations from less comprehensive to more comprehensive classes. Thus, supposing we know the classes "plough," "spade," etc., we may pass upwards to "agricultural implement," or higher still to "tool"; or, starting from a more comprehensive class, say, "man," we may carve out of this a number of smaller classes by introducing differences, as when we "divide" the class "man" into "civilised man" and "uncivilised man".

Definition. To *define* a name in the logical sense is to unfold its meaning (connotation), to enumerate more or less completely the several characters or qualities which it implies. Such a process of reaching the content or implication of a name implies a careful comparison of instances, an analytical separation of the several common qualities, and an explicit enumeration of these in words. This last constitutes what is specifically known as definition. This only becomes possible after the more methodical kind of analysis of meaning has been carried out.

A second and subordinate part of this process of definition consists in the discrimination of the concept from other and allied concepts. The precise meaning of a word may often be well brought out by setting the underlying concept over against its opposite or contrast, and by discriminating it from more nearly allied notions. Thus, for example, the notion "wise" is elucidated by contrasting it with "foolish," and further by distinguishing it from allied notions, such as "learned".

Relation of the Educator to Abstraction. The problem of exercising children in analysis and generalisation is one of special importance and of special difficulty. Its special importance depends on the fact that the systematic carrying up of knowledge of particulars into a general

form underlies all that we mean by the higher or more scientific kind of intelligence. Its special difficulty lies in the fact that all the higher processes of abstraction involve a peculiar effort of attention which develops slowly and only, as a rule, by help of special training. Now much of our instruction involves a highly generalised and abstract language, so that heavy demands are made on the child's power of abstraction. Hence we must see that we do not push on too quickly so as to outstrip the stage of thought-capacity attained by the learner. Progress in power of abstraction cannot be ascertained by examining a child's vocabulary. Ziehen and Meumann have found that among children aged from about six to thirteen years the less intelligent use a larger proportion of abstract (as distinguished from concrete individual) language than the more intelligent. This fact throws an ironical light on one effect of the action of a cultured environment in introducing to children an abstract language for which they are not ready.[1]

Yet we may easily go to the other extreme and regard the process of generalising as wholly distasteful and "unnatural" to a child. That this is an error is clearly shown in the fact that children spontaneously occupy their minds in discovering resemblances among things and in the more simple kinds of generalisation, and appear to find a certain satisfaction in this activity.[2] If only we avoid "springing" the higher abstractions on them, and lead them on by judiciously graded stages to the higher kind of generalising, we ought to succeed in making the work interesting, and at least moderately agreeable.

Simple Exercises in Generalisation. The training of the mind in thought-activity should begin by simple exercises in analysis in connection with sense-observation (see p. 186). By this means, a child may be led to apprehend the existence of qualities, such as the weight of a piece of clay or lead, through having the object brought

[1] See Meumann, *op. cit.* i., pp. 224 ff., *cf.* pp. 221, 222.
[2] For examples, see *Studies of Childhood*, pp. 162 ff., 426 ff.

into juxtaposition with other objects, some resembling it, and others contrasting with it, in respect of its weight.

The more complete and methodical kind of exercise in generalisation aims at leading the child's mind to grasp the common qualities of a recognised group or class. Here the first all-important step is a judicious selection of particulars for inspection. In making this selection the teacher should remember that it is first impressions which give the peculiar stamp to our ideas. A child who has first learned what an isosceles triangle is from the gable of a house will later tend to think of the form in this particular embodiment. Hence, the illustrative examples first brought under the attention of the pupil should be such as most clearly exhibit the characteristic qualities of the class, and therefore best serve as its representatives. In an elementary lesson on botany, specimens of leaf, flower, root, and so forth, showing the typical form, should be preferred to extreme instances diverging from the common type.

In order to make the essential qualities prominent and impressive, and to reduce the attractive form of accidental individual accompaniments, the teacher will do well, wherever it is possible, to *isolate* the former. This valuable expedient of isolation may be made use of in lessons on number, in which, for example, by employing small and unattractive objects, such as peas, children's attention may be led more readily to focus itself on the property of number.

It follows, from what has been said above, that a sufficient *variety* of instances must be supplied in order to ensure a distinct and accurate concept of a class. No doubt a certain discretion is needed here. The number of instances necessary to a clear concept is not the same in every case. A teacher may easily confuse a child by introducing too many examples at one time. All true instruction means selection and simplification of nature's

material, and the great thing at the outset is to present *fitting* examples. In certain cases it may not be necessary to go beyond these. One or two good illustrative instances of a single property, *e.g.*, transparency or weight, may suffice for a clear apprehension of the property.[1] On the other hand, it may safely be said that variety of illustrative instances is especially important in bringing out less obvious properties, such as number and form. The same is still more manifestly true in the case of classes of objects constituted by a number of properties, such as metal, plant, and the like. Here it becomes important to exhibit as soon as possible something of the *range of variety* of the objects composing the class. Hence, while it may be right at the outset to keep to one or two representative examples, the teacher does well to take the child on to a discovery of the same characteristic group of qualities in widely dissimilar surroundings. Education throughout its course should concern itself with the *enrichment* of children's concepts, *e.g.*, the moral concepts "good" "just" and "wise".

Once more, throughout this training the teacher should seek to combine the exercise of discrimination with that of assimilation. In developing the concept "transparent body," for instance, he should invite the child to distinguish between transparent and opaque bodies. In this way even the first simple exercises in generalisation should be made to subserve *classification*, that is, the due arrangement of classes.

Explanation of Names. This exercise in the comparing and grouping of objects should be supplemented by supplying the name of the class so formed, and enumerating, in the shape of a definition, the several qualities detached in the process of generalisation. This part of the process is attended with its own peculiar risks. It is often forgotten that definition is the *summing up*, in a concise formula, of knowledge already gained by observation.

[1] See A. Bain, *Education as a Science*, chap. vii., p. 197.

Definition does not precede, it follows the careful inspection of things. It is only when the qualities of things have been inspected and marked off by suitable names that a definition has any intelligible meaning for a child. Even in teaching a subject which is supposed to begin with the consideration of definitions, like geometry, the teacher should, as a preliminary, supply examples of approximately correct forms—straight line, right angle, etc. —the nature of which is to be brought to light by the definition.

The test of a good definition is that it enables us at once to recognise members of the class, and saves us from confusing these with members of other classes. In order to become this, the definition must not only bring into view essential (as distinguished from accidental) qualities, but must enumerate a sufficient number of these. To define a "church" as "a building with a steeple," or a "metal" as "something hard and 'shiny,'" would be to define badly. The logical form of definition, by reference to a higher class, may well be resorted to when the pupil is already acquainted with this. Thus the term "sledge," after showing a model or picture of the vehicle, would naturally be defined by bringing it under the class "carriage," and giving as its difference the presence of runners in place of wheels. If, however, the higher class is not already known, this mode of definition becomes impracticable. It would be absurd, for example, to define a whale as a mammal before the child had reached the idea of mammal. Throughout, the teacher's aim should be to get as near to a good scientific definition as the age and previous knowledge of his pupils allow.

The true use of a definition is found in its application to new examples. When, for example, the term "cape" is defined a child should be encouraged to search out on the atlas *new* instances. We do wrong in supposing that an abstraction is the goal of knowledge; in truth it is but a temporary resting-place on the road to it. The real use of abstractions—save, indeed, those which, like the

concepts of the higher mathematics, may be said to move in a sphere of their own, remote from that of sense-experience—is to enable us *to think more meaning into what we see*. A child who has formed the concept "leaf," and attained by means of a good definition a precise knowledge of its general structure and function, is able to read more into any leaves which he observes.

Although we should need supernatural powers to save children from all misapprehension of the meaning of our words, yet, by taking pains to explain what is explicable to childish intelligence, we may greatly reduce the range and the duration of their indistinct and confused conception. Thus, we may endeavour to explain to children the different meanings of the same word, and exercise their minds in distinguishing between the primary, and the secondary, and often figurative, signification.

To explain a term is always and necessarily to make some appeal to the learner's experience, to his real world. Thus in explaining a moral term, *e.g.*, "unjust" or "faithful," the educator should take pains to go back to illustrations supplied by the child's own experience and the knowledge already assimilated by oral instruction and reading. Where, as in explaining many of the terms used in history, the instructor cannot thus appeal to quite pertinent examples in the child's circle of experience, the utmost use must be made of the *analogies* which that experience affords, so as to secure the construction of ideas, as clear as possible, of concrete examples.

The educator should keep jealous watch over the child's use of words with the view of correcting a slovenly application of them. Clear thinking finds its greatest aid in verbal expression, and children should be encouraged to express their ideas as clearly as possible. Pains should be taken to test their knowledge of the meaning of terms by getting them to supply examples and to frame simple definitions. Such definition often forms the natural close to a lesson.

NOTES.

NOTE A (p. 305).—Our general ideas are formed out of images, and may be said to depend on these, not only for their first formation, but for their continued vigour and distinctness. They depend also, in certain cases, on the formation of *new* pictorial representations. The clearness and fulness of the pictorial images is indeed one chief condition of the attainment of clear and exact general ideas. It is only, for example, when a child can readily recall the whole look and feel of a piece of clay, or of one of the metals, that he can go on to think in an abstract way about its several qualities, so as to reach the general notion of "clay" or "metal". To say this is quite consistent with saying that in much of our later use of familiar general names, we have few, if any, imaginative elements present to consciousness. Yet, if not always present, they must—if we are to retain the general ideas as unimpaired representations of real things—be reproducible *when needed.*

NOTE B (p. 319).—The following are given by Ament as the dates of the first use of the various parts of speech in the case of one child:—

354th	day	noun.
503rd	,,	interjection.
528th	,,	adverb.
548th	,,	pronoun, verb.
614th	,,	preposition.
615th	,,	article.
653rd	,,	adjective.
751st	,,	numerals.
1027th	,,	conjunction.

The use of the first personal pronoun was mastered by the 631st day. See also Tracy's *Psychology of Childhood.*

NOTE C (p. 320).—Many savages cannot count above five, while a cat's arithmetical capacity is shown in the fact that when only one kitten out of a number is left it is apt to be miserable; whereas when two out of five are left it seems to be contented. A similar limitation in the apprehension of number is observed in the case of birds. Thus, if there are four eggs in a nest, one may be taken without troubling the mother; whereas if two are removed she will probably desert the nest.

CHAPTER XIV.

THOUGHT-ACTIVITY (*continued*) : REASONING : ORGANISED KNOWLEDGE.

Systems of Knowledge. The student must have noticed that many times in our treatment of the intellectual phase of mind we have had occasion to notice a grouping of mental elements into systems. Thus we saw that in the process of perception the several sense-materials do not persist in isolation but become organised into a single whole, gathering about them an aura of meaning. Again, in speaking of interests it was shown how mental activity circles round certain points which are intimately related to feeling. Once more, when dealing with mental reproduction, we found that the process in its more complete form involves a systematic grouping of ideas (apperceptive systems). This tendency to organise mental elements into a coherent system becomes more clearly marked in the higher stages of mental development. This has been illustrated in the idea of Self, and will again be brought out in dealing with the Sentiments. We may now consider this work of organisation as it appears in the processes of thought.

That children show a tendency to group their facts into systems, must be well known to every teacher. A class, being questioned by a visitor in a Scripture lesson as to the position of Rome, showed nothing but blank faces, till the teacher hinted, "Come, children, that's Geography"; when their minds instantly turned from divinity to topography and found the needed answer

Whatever moral we as teachers may draw from this incident, it must at least impress on us the fact that grouping of elements of knowledge is a natural process of development.

In the highest phases of knowledge the growth and organisation of such systems becomes very important. From a practical point of view, an isolated fact is a useless fragment—save perhaps as a starting-point for a new group. Thought reaches its highest development in Science where a mass of facts belonging to the same order, and a number of general truths relating to these, are all clearly and methodically set forth in their proper connections. Each concrete fact is brought under its proper class; each single occurrence under its proper "law". Not only is every part of a fully developed science consistent with every other part, but the several parts are closely co-ordinated one with another by the help of the most comprehensive generalities.

The organisation of mental groups is a mark of an enlightened mind whatever the particular field of knowledge to be explored. A student of archæology, for instance, will mentally "place" any ancient building to which his attention may be drawn, referring it to such-and-such a style of architecture and to such-and-such a period. In being thus apperceptually carried up into a system, the new observation becomes apperceived as one more illustration of a general class or type; while it tends to modify the system into which it is taken, giving it more concrete fulness and complexity.

Every universal law or general principle acts as a connecting thread, binding the various particular cases which fall under it into a system. Thus the law of gravitation is the controlling principle which unites in our thought the moon's movement round the earth with the fall of the apple from the tree; and the general truth that "all living things must die" holds together the withering of a plant and the "passing of Arthur".

The methods which thought develops for dealing ex-

plicitly with the formation and organisation of such systems have been touched on in the preceding chapter. Science *classifies* its facts by grouping them systematically in higher and lower classes. The more complete form of this methodical organisation is illustrated in the Deductive and Inductive methods of inference or reasoning.

Inference or Reasoning in General. In the process of judging we establish a relation of thought between two previously disconnected ideas. Such a process may, as we have seen, grow immediately out of observation, as when I say "This is chalk;" or out of memory, as when I say, "I saw the flag flying yesterday". From such a mere process of judgment we must distinguish the judgment which results from a process of inference. When, for example, I notice that the sky is overcast and predict a shower of rain, I reach the final judgment in my assertion as a conclusion from another piece of knowledge. Regarding the overcast sky as a sign of rain, my thought moves on from the presence of the one to the coming of the other. It is evident from the above example that inference is based on the detection of similarity or dissimilarity among our experiences. I take the dark heavy sky to be a sign of rain because I assimilate it to previously known instances of such a sky which have been followed by rain. If, however, on second thoughts I note certain distinguishing peculiarities in this case of overcast sky, I may hesitate to draw the conclusion, ascribing the heaviness, perhaps, to a heat-mist.

If now we look at this example from the point of view of systems of thought, the process is seen to resolve itself into finding in the system which we may call "weather system" a relation between a lowering sky and consequent rain.

A somewhat similar process occurs when the mind of a child or of an ignorant adult passes at once to a fact as yet unobserved without clearly setting forth the ground for the conclusion; as when a child predicts that this water will wet his clothes, or that this grown-up person

will be able to tell him something he wants to know. This is presumably the way, too, in which the lower animals proceed when recognising the proximity of their prey, etc. Whether, however, these anticipations without any clear apprehension of grounds are correctly described as inference is doubtful. It certainly is not the full, explicit inference of *reasoning*, since the connection between what is presented and what is inferred is not distinctly apprehended.[1]

Such a process, however, seems to shade gradually into what we all recognise as true inference. A step is taken towards a more reflective process when a child distinctly recalls some fact of past experience and applies it by way of analogy to a new case. A still more complete process of reasoning takes place when a child is able by the help of general ideas mentally to grasp an *universal truth*, making this the ground of his conclusion. Thus, when he begins to apprehend the general truth that adults are better informed than children, he will proceed to reason more reflectively that the grown-up stranger A. B. will be able to tell him something he wants to know.

Relation of Judging to Reasoning. We may now try to define the relation of judging to inferring. In its higher or more developed form, reasoning clearly presupposes judging. When set out formally, reasoning is passing from certain judgments to other judgments recognised as following from the former. Thus before a boy can reach, by a process of reasoning, the conclusion that this piece of wood will float in water, he must have already thought out the truth that all substances of a certain order (*e.g.*, those lighter than water) will do so.

While, however, judgment is thus a pre-condition of the more reflective or logical type of reasoning, it must not be forgotten that there is an element akin to inference in a good deal of what is commonly described as judging. Even in the simple act of recognising an object by certain

[1] Stout refuses to call it inference. See *Analytic Psychology*, ii., p. 71.

visual marks, our mind is apt to go beyond what is actually observed at the moment, supplying a fringe of meaning to the sense-presentation. Now, as we have seen, the apprehension of meaning is a part of the whole perceptual or apperceptual process, and is closely interwoven with the sense-presentation. Psychologically, therefore, we cannot speak of the mind's carrying out a process of inference in this case. Nevertheless, from a scientific, a logical, and one may add, a jural point of view, we have to distinguish what is immediately presented from the significance we may ascribe to this. And all of us recognise an ingredient of inference in certain complicated processes of apperceptual judgment, as when from merely seeing a man we say that he is an Irishman. To this one may add that every process of reasoning obviously ends in a judgment as its conclusion.

Inductive and Deductive Reasoning. The process of organising mental systems which underlies all clear explicit inference gradually differentiates into two parts: (1) the further organisation of systems of knowledge already existent, including the embodiment of new facts and laws; and (2) the construction of a new system (or the reconstruction of one that has broken down). These parts are respectively Deductive and Inductive Inference; and from the above description it is evident that a complete process of reasoning must include both parts, induction, in order to form the system, and deduction, in order to develop explicitly the relations of its several parts. It is to be added that the names "induction" and "deduction" are most appropriate when the processes are carried out methodically, as explained in Logic.

Nature of Induction. The process of inductive inference is illustrated in a simple form when a child discovers the permanent qualities of an individual object. That "my knife will cut," or that "my pussy will scratch" is a kind of universal truth reached by a comparison of a number of particular instances in which the object in question has been known to cut or to scratch. The child, in this

case, analyses, compares and combines, so as to reach a judgment true of the individual *at all times*. Such a process may remain implicit and unexpressed till, say, the need to warn another child urges him clearly to recall, more or less fully, the previous instances, and to set forth his conclusion in a judgment. This explicit process fulfils all the conditions of a perfect inference, the particular experiences of the cutting or scratching being now explicitly placed as instances of a general rule, and so embodied in a mental system.

Commonly, however, induction goes beyond the individual thing, and discovers what is true of a *class* of things. Thus a child observes that his toys, spoons, he himself and a vast multitude of other things fall to the ground when they are not supported. Little by little he assimilates these facts one with another, and seizing the essential circumstance which runs through them, links them into a single system of knowledge by means of the judgment, "all unsupported bodies fall". In very much the same way he may reach the general proposition, "all metals sink in water".

As we have hinted in the case of falling bodies, such wide systems are only rarely built up at one stroke. The conclusion "all bodies fall" would pretty certainly be arrived at very gradually. Far more common than the organisation of a new system is the reorganisation of one, through the construction of a new basis, when the system has proved itself incapable of including all the observed facts. Let us suppose that our boy is noticing a balloon for the first time. The fact that so far from falling, like other bodies, it actually rises in the air, will not fit into the system of ideas about bodies which his thought has constructed. Hence, since the fact cannot be disputed, the system has to be altered. Thus a new reasoning process is started, involving a closer observation and comparison of facts, and tentative constructions of a new theory which will embrace all the facts, until finally he recasts his system by help of the more adequate hypothesis,

"All bodies, heavier than air, fall". A similar reorganisation of system takes place in the case of the sinking of metals, as soon as the child's attention is directed to such an object as sodium or potassium floating upon the water. A more advanced example of such a reorganisation is supplied by the Science of Chemistry. The discovery of radio-activity led to a revision of the concept, "chemical element," and of the whole system which had centred in this concept.

The inductive type of inference, then, is seen at work in the organisation of new mental systems, and, more frequently, in the reconstruction of existing systems so as to meet the case of some new facts, for which the existing systems find no place.

Control of Inductive Reasoning. The regulation of the processes of inductive reasoning according to the principles of Logic becomes a somewhat complicated and difficult matter. It must suffice here to say that we move in the direction of the logical ideal when we take pains to examine a sufficient number of cases, and avoid "hasty generalisation" from one or two facts; when we carefully analyse our facts, adding, when possible, active *experiment* to observation, so as to discover what are the precise conditions on which the occurrence of a particular phenomenon depends, and to eliminate what are mere accidental accompaniments of the conditions. Thus, in order to reason rightly and scientifically about the causes of ordinary combustion, we compare numerous instances, such as the burning of coal in the grate, the gas flame, etc., and, by analysing these and ruling out what is accidental, arrive at the common circumstance, the presence and combination of certain substances, such as carbon and oxygen. By placing a piece of carbon in oxygen we afterwards show experimentally that these are relevant as conditions of the result.[1]

Process of Deduction. The other chief type of explicit

[1] For a fuller knowledge of the proper methods of Induction as regulated by Logic, see Carveth Read, *Logic*, chap. xv. and following.

reasoning, namely, deduction, implies that the mind has a number of systems of knowledge of various kinds, which have been reached by the process of inductive reasoning. Such knowledge may have different materials. It may deal with substances which possess similar properties, with movements, and changes generally, due to similar causes—including human actions—or with quantities and spaces having the same relations of parts. In the formation of such mental systems the child is, of course, greatly aided by the instruction of others; though his knowledge only grows clear and self-realised after he has himself observed and compared facts illustrative of the truths.

The systems thus formed, however, will necessarily be incomplete in their organisation. While many of the relations of whole to part and of part to part may have been made explicit, others will remain unapprehended or only dimly thought out, and many things appropriate to them will not yet have been included. Hence, further organisation is needed. This will be carried out by deduction.

There appear, then, to be two chief points of difference between induction and deduction, (1) Since in induction the individual facts are given, the problem becomes, how to construct the system; whereas, in deduction, the system being given, the problem is to find further relations of part to part or of part to whole, or to extend it to new cases. (2) While in the inductive process thought is tentative—there being many possible bases of organisation each of which may appear, at the stage of knowledge reached, to do equally well—in deduction the movement of thought is definitely determined by the fact that there is only one solution admissible under the developed conditions of the problem. Hence more definite rules can be given for testing the conclusion in the case of deductive reasoning than in that of inductive reasoning.

We may illustrate this further organisation of knowledge by a reference to the growth of a mechanical system. After James Watt had greatly improved the steam-engine,

transforming it from a toy into a practical machine, it remained incompletely automatic in its working, having to be tended by a lad, who turned a tap when the beam reached a certain position, and reversed this movement when it reached another position. This lad, impelled, perhaps, by a boyish eagerness for play, discovered that by arranging a string from one of the moving parts of the machine he could make it do his work for him—a discovery which for once pleased employer and employed alike. Here the machine corresponded with the mental system already formed. The extended interconnection of the parts of the machine introduced by the string involved a further development of the mental system from one incompletely self-sufficing to one completely self-sufficing.

The stock illustration of deductive reasoning in school work is Euclid's Elements of Geometry. Here we have a system of knowledge formally given in the shape of axioms, definitions and postulates; after which, by constructing various figures, the relations of their parts may be demonstrated according to the axioms and definitions. Similar examples may be found in other school subjects, for example, Arithmetic. Thus, in dealing with the subject of "Interest" we may be supposed to set out with the four chief rules, which may be viewed as postulates, and to proceed to definitions of "interest," "principal," "time," "rate per cent," and "amount". At this point it becomes possible, by means of deductive reasoning alone, to arrive at such relations between these that all problems of Interest are seen to be solvable.

Application and Explanation. Deductive reasoning, in its simplest form, involves the use of a general truth as a *principle*, and the connecting with this, through an intermediate link, of a less general truth not before connected with it, and possibly not even known. The truth thus connected is known as the conclusion. The process may begin at one of two ends, so to speak: (1) We may have a principle given us, and, by combining with it another piece of knowledge, be able to draw a conclusion from it.

This is known as the *application* of a principle, or as the setting out of a fact or truth as a new illustration of our principle. In this way, new discoveries may be made by skilfully combining truths which are already known. When, for example, a child learns about the sharp incisor teeth of the rodents or "gnawers," and then finds out that the squirrel is called a gnawer, he will be able to draw for himself the conclusion that squirrels possess such teeth. In this way, thought is able to move in advance of observation, and to conclude beforehand as to how things will behave.

(2) We may set out, not with a general truth, but with a particular fact, and seek for the general truth under which it may be brought. This is known as *explanation*. In its simplest meaning "explanation" is throwing light on a new and unexamined fact by pointing out its analogy to some known fact. Even a fanciful apperceptual interpretation of a new presentation, *e.g.*, of the star by help of the spark, supplies something of the soothing effect of an explanation by reducing what looks strange and alien to the familiar and homely. A step towards "explanation" in the narrower scientific sense is taken when a child begins to classify things, and to point to causes and supply reasons, as in saying "This apple is from a crab-tree," "He struck me because he was angry with me". In its stricter form explanation always involves the application of a general principle—whether already established or adopted as a hypothesis. In this case the cause of a thing is thought into a general form. Thus a boy explains to himself—or, perhaps, to his less-well-informed sister—the fact that the whale must come to the top of the water to breathe by bringing to bear on the fact the general truth that whales are creatures which breathe by lungs.

Control of Deduction. The processes of deductive reasoning, though in general much simpler and easier to carry out than those of inductive reasoning, may be imperfectly accomplished and lead to an erroneous or invalid con-

clusion. Hence the need of logical principles to guide us. These are easily understood, and are capable of being studied long before the principles of induction can be mastered.

Without going into the technical details of logical science, it may be pointed out that since the fundamental part of the process of reasoning is the detection of similarity, the great source of erroneous reasoning is the confusion of things which are not really similar in the way required; in other words, a want of discrimination. The loose reasoner from general principles is one who cannot see where similarity ends and difference begins. Children's reasonings are apt to be affected by this source of error, since their knowledge of the properties of things is defective, so that they easily mistake a superficial resemblance for a vital one, as in their so-called reasonings from analogy, *e.g.*, in arguing that a black man ought to be washed. A large part of the common errors in deductive argument arises from imperfect apprehension of the meaning of language, and more particularly from failing to distinguish the different meanings of a term. Children's reasonings often illustrate this source of error, as when they urge that they act properly in *punishing* their "naughty" brother or sister.

Reaction of Systems of Knowledge on Apprehension: Apperception. As illustrated above, in chapter viii., thought reacts on perception. A similar reaction is involved in the clearer apprehension of the concrete things, our knowledge of which comes through the medium of others' verbal communication. This clearer insight into the particular, by the use of general concepts and judgments, is a higher stage of the process of Apperception. We can, indeed, only give our particular knowledge the utmost degree of clearness by thus bringing in the general or universal as apperceptual mould, *e.g.*, in classing this stone as a fossil or as an arrow-head, or in recognising the behaviour of a high-handed monarch as a kind of tyranny.

When knowledge becomes systematised this grasp of

the new by help of pre-existing thought-products becomes a complex process. Thus a classical scholar whose mind has a well-ordered store of knowledge will classify any new Latin work which comes under his notice as the work of a particular Latin author, belonging to a particular period and a particular school. In so doing he *assimilates* the new to the old. At the same time he more or less explicitly apprehends the relations of difference between the characteristics of this period and those of others, and between those of this particular writer, and those of contemporary Latin authors. Lastly, he establishes certain relations of time and cause and effect, in tentatively fixing the date of the work, and in detecting the influence of an earlier writer or school on its style. This has been called the assimilation of a new fact by way of an Apperceptive System.[1] As pointed out above (p. 225) this assimilation of new elements into an apperceptive system implies the modification both of the elements themselves and of the whole system into which they are introduced. The highest form of this apperceptive organisation appears in the rationalised systems of Science, and may be called Rational Apperception.

Early Reasoning.

Processes Antecedent to Reasoning. The development of the power of inferring or drawing conclusions proceeds in close connection with that of the ability to judge. At first, as already observed, there appears a process which is implicit only and not reflective. A child will draw a conclusion about the taste of this fruit, or the use of this tool, merely because he recognises it as like what he has already observed. The first illustrations of this process resemble animal "inferences" in being new modifications of action, *e.g.*, the invention of a gesture to suit a new situation. The element of reasoning in these cases is seen

[1] See Stout, *Analytic Psychology*, book ii., chap. viii.; Lange, *Apperception*.

in the analogies to previous experiences which serve as a clue to the new performance. The importance of freedom of action for the development of reasoning in this early period is said to be illustrated in the fact that as reasoners boys shoot ahead of girls.[1]

This implicit process of inference is further seen in the early stages of *expectation*. When, for example, an infant shows by his gestures and cries that he knows the meaning of pouring water into the bath, of putting on his out-of-door clothes, and the like, it is evident that there is a crude movement of thought from present signs to the coming experiences which they stand for.

A more advanced process of reasoning begins to show itself when the child acquires the use of language. Thus a little boy was told by his father not to eat some brown sugar which he was taking out of a bag. He answered promptly and emphatically, "Ni!" (*i.e.*, nice). This was clearly finding a reason by way of justification, "I eat it because it is nice".

Rudiments of Reasoning: Early Ideas of Cause. When he grows proficient in the use of language, the child proceeds to carry out a somewhat more explicit process of reasoning. The connection of reasoning and systematisation of knowledge considered above will, of course, prevent us from looking for any sharp division of young children's reasonings into inductive and deductive. The procedure at this stage is inference from one case to another which seems to be similar, as when a two-year-old child, on being told by his father not to pull hairs on his wrist because it hurt him, retorted, "It didn't hurt Grandpapa".[2] Needless to say, these early gropings of man's "reasoning faculty" are apt to appear to us clumsy enough. Here is an example. A boy of two and a half was accustomed to dwell on the fact that he would in time grow to be big. One day as he was using a small stick as a walking stick his mother told him it was too small; whereupon he at

[1] Thorndike, *Notes on Child-Study*, p. 99.
[2] Thorndike, *op. cit.*, p. 94.

once remarked: "Me use it for walking stick when stick be bigger". He had implicitly argued that other things besides living ones tend to grow bigger in time. The implicit reasonings of the young and of the uneducated are often of this type. The tendency of all of us is to argue that what is true of ourselves, and of our own little sphere of observation, is true of mankind and of things generally.

There is much to suggest that a child models his first idea of cause on the pattern of his own actions. As we all know, his first far-ranging inquiry is of the form: "Who made the snow?" or "Who made the flowers grow?" Though we cannot be certain what "make" means for a child's consciousness, it is probable that he thinks of the production of changes in his world as effected by actions analogous to his own. The full development of this anthropomorphic tendency to assimilate natural processes to human activity is seen in the first large use he makes of the idea of purpose or "final cause". The meaning of the question, "Why?" in the mouth of a child of three or four seems equivalent to "For what purpose or end?" and more particularly "For what benefit to the lord of creation?" It is one of the graver disillusionments of the advancing years to discover that nature is not always the convenient servant of man.[1]

The early attempts of children to think out the causal connections between things are apt to result in crude or hasty generalisations. The noting of only a very slight analogy will often lead a child to conclude that things are produced in the same way. This tendency assumes sometimes an amusing form, as when a boy of two years and ten months said that he would put water on some bits of bread lying on his plate in order to "melt" them. Hasty reasoning with respect to causes shows itself, too, in other ways. The desire to find how a thing has been "made" often leads a child to fix his mind on any

[1] On children's notions of the processes of nature, see *Studies of Childhood*, chaps. iii. and iv.

attendant circumstance, though this may be only accidentally present in the case, and have nothing to do with the effect produced. Thus the same little boy at the age of two argued that milk was white because it came from a white cow which he had happened to see. Again, the childish mind is apt to argue erroneously that a thing is always produced by one and the same cause, as when a wee two-year-old, having scratched himself, and being asked how the blood had come on his hands, said, "Fell down on path".

Such crude childish inference gradually gives place to a more careful type of reasoning as the young mind develops a finer ability to analyse and compare what is seen. In this way things get connected with their proper adjuncts and causal antecedents. Not only so, this same development of thought-activity leads to a mental grasp of truths of a wider and more abstract character. Concurrently the growth of discriminative power leads to a more careful discernment of the variability of experience, and so to greater caution in making large statements. Thus, children at a certain age may be observed to introduce such expressions as, "some things," "many people".

A boy of three or four, as soon as he begins to grasp the meaning of general terms, will begin to apply a simple rule to particular cases. He will argue, for example, that nurse is unkind because she will not gratify his wish. As this example suggests, however, he is very apt to apply rules to cases too hastily, through an imperfect examination of the element of similarity in the cases compared.

Progress in the early reasoning shows itself in two ways: (*a*) It is seen in the thinking out of the less obvious applications of a rule. A child, as he grows more thoughtful, will be able to recognise a breach of the law of kindness in such things as practical jokes and rudeness. (*b*) Progress is further seen in the appearance of the discriminative caution already referred to. A thoughtful child is not only quick and penetrating in discerning points of identity

which offer a pathway for new applications of rule, but he is critical in his applications, distinguishing cases where the reason or explanation fits from those where it does not fit. A marked advance is seen when deductive reasoning has developed sufficiently for the child to follow out *a chain of reasoning* such as is illustrated in a complicated arithmetical problem or in a demonstration of Euclid. According to Meumann, the ability reflectively to survey (*überblicken*) and understand the inferences and chains of inference carried out is probably only reached in the fourteenth year.[1]

Exercises in Reasoning: Children's Questioning. The work of training the young in the processes of reasoning is closely connected with, and grows out of, the development of their power of judgment. In the earliest stage (from about the beginning of the fourth year) the mother is called on to satisfy the child's curiosity both about facts and about the reasons of facts. This period is an important, and indeed a critical, one for the subsequent course of intellectual development. No doubt, ceaseless questioning is trying to the patience, and children know how to tease their elders in this, as in other ways. The habit of pestering older folk in a boy with a turn for a Socratic following up of question by question is, indeed, as Mr. Punch has recently illustrated, more than a matter-of-fact Philistine of an uncle can be expected to endure.[2] Nevertheless, it is an error to suppose that the greater part of childish interrogation is something to be deprecated. Even when the questions are repeated and followed up by others in what sounds an unintelligent and half-mechanical way, they may be assumed to express at least a momentary attitude of curiosity.[3] Hence it seems to be a good rule to meet a question with an explanation

[1] *Op. cit.*, i., p. 256.

[2] See the papers headed "Cross-examinations for the Home," *Punch*, June, etc., 1909.

[3] For illustrations of children's questions, see *Studies of Childhood* ("The Questioning Age"), p. 75 ff.

wherever the nature of the subject allows of a simple and intelligible one.

In answering children's questions we should, of course, be careful not to indulge them in habits of intellectual indolence and in a weak dependence on others. They should be stimulated to find out for themselves, as far as may be, what they wish to know. As Madame Necker puts it, a word or two to put the young questioner on the track of what he wants us to tell him may be "seeds which will fructify with time" (Note A).

Questioning in Teaching. The training of the reasoning powers includes much more than the answering of the child's questions. The young learner must be questioned in his turn about the things he sees or hears of, about the properties and uses of these things, about their causes and effects. And we may rightly bring some of the child's own interrogative pertinacity into this questioning. We have already, when dealing with mental reproduction and other processes, touched on the educational function of questioning children. It has a well-recognised value at the beginning of school life, as a means of ascertaining the stock of notions with which the learner starts (see p. 181). Again, it comes into definite stages of the lesson: into the beginning as a means of freshening up, and possibly further developing, old knowledge, so as to prepare the pupil's mind for assimilating the new knowledge-material about to be presented; at the end of a section of the lesson, in order to determine how far a class has followed and correctly assimilated the teaching; and, once more, at the end of a lesson to enable the teacher to bring together the chief points dealt with, and to see whether the relations of the different parts of the lesson have been firmly grasped.

Again, a question may be used to stimulate and direct an act of observation, or one of recollection, or one of constructive imagination, *e.g.*, "what would you have done?" in such and such circumstances. But the full educational value of a question only appears when it is

employed as an instrument in training the child to think, that is to say, to try to make his ideas and his language clearer, to compare, to judge, and to follow out a train of thought.

In order to understand this educational function of a question, we must glance at the nature of the process set up in the learner's mind by a question which stimulates thought. To begin with, a question is, obviously, an immediate demand for a properly expressed piece of knowledge. A child, when in his teasing, questioning mood, may, no doubt, make such a demand and exercise his princely authority, but the teacher's question should carry yet more weight and urgency. Hence the child when questioned has to carry out a very exceptional effort of will in concentrating his attention on the point of the question, so as to reach at once a definite judgment, and proffer it as answer. A boy may, no doubt, be confused by the urgency, or be too eager to supply the first answer; but if so, he soon learns that short-cuts which seek to avoid strenuous mental activity are likely to lead him to shame rather than to glory.[1] This demand on intellectual self-activity is seen in many questions which, though they aim primarily at recalling old knowledge, exact a certain amount of comparison and judgment, as in the form: "Name an instance of glaring violation of the constitution by an English Sovereign". The demand is still more clearly apparent in questions about the meaning of words, and about the relations of things, such as the similarities and dissimilarities disclosed in the actions and characters of historical personages, the connections between the natural features of a country and its chief industries, and the reasons of men's conduct.

We may say, then, that putting a question is a means at once of exciting and of controlling the child's thought-activity. The more frequently questioning is effectively introduced by a teacher, the more does learning approx-

[1] Meumann observes that in his experiments he found that answers were the more worthless the shorter the time they took (*op. cit.*, i., p. 232).

imate to the freer originative kind of thought as contrasted with the more strictly pre-determined and interpretative kind.

In order to see how far teaching may become questioning in its method, we must select a subject like mathematics in which thought moves along a chain of firmly connected parts. No one, perhaps, can appreciate all the educational possibilities of questioning who has not watched a good mathematical teacher carry with him, or with her, an intelligent class through some new "rider" in geometry, directing and controlling every step, yet hardly seeming to do more than to open up this and that path, along which young thought when inspired by keenest interest can advance quickly and smoothly.

It need hardly be added that the skilful plying of the art of questioning presupposes an intimate knowledge of the pupils, and a fine judgment in selecting points and forms of expression. Just because it is the crown of the teacher's art, it is probably the best-abused of the teaching methods—abused on one side by such faults as vagueness and want of point, or needless difficulties of language, which paralyse, instead of stimulating, thought; on another by obviousness of solution—the answer starting up, so to say, behind the question and grinning at the learner—which discourages ambition and probably disgusts the intelligent child.[1]

Science as a Means of Training the Reasoning Powers. The systematic training of the reasoning powers has for its chief aim the avoiding of the errors incident to the processes of induction and deduction. Children need to be warned against "hasty generalisations" respecting the causes of things, to be led by a more methodical comparison of instances, and analysis of these, to distinguish essential conditions from mere accompaniments. In like manner the teacher needs from time to time to guide the

[1] On the value and conditions of suitable questioning in teaching, see Fitch, *Lectures on Teaching*, chap. vi.; Adams, *Primer on Teaching*, chap. vii.; and G. Compayré, *Psychology Applied to Education*, pp. 126 ff.

young reasoner in drawing conclusions from principles, by helping him to see the limits of a rule, and to distinguish the cases that properly fall under it from those which do not; and, further, by familiarising him with the dangers that lurk in ambiguous language. In the later and more systematic training in reasoning some knowledge of logical principles will be found indispensable to the teacher.

It follows from what has been said that there is no subject of study, dealing in a connected and methodical way with a group of facts, which may not, in the hands of an intelligent and efficient teacher, be made an instrument for developing a child's reasoning powers. Thus lessons in physical geography may be used as an occasion for exercising older children, not only in forming clear scientific concepts, but also in reasoning as to the causes of simple natural phenomena, such as rivers, mountain-forms. History, again, when well taught, may be made to exercise the learner in tracing similarities and dissimilarities, not merely in circumstances and in personal character, but in the relation of the one to the other—as illustrated, for example, in the various modes of treatment of a conquered people by their conquerors. It is, further, one of the best fields for exercising older pupils in tracing a prolonged series of consequences flowing from, say, a single human action, or the introduction into a country of a new institution. Lastly, it provides an excellent field for a careful critical estimation of the comparative values of conflicting pieces of evidence.

While all sciences are fitted to train the mind in an orderly arrangement of knowledge, they have different educational uses; some exhibiting more of the inductive process, others more of the deductive. The physical sciences (so far as they are not treated mathematically) are largely classificatory and inductive. That is to say, they proceed in the main by a careful observation, analysis and classification of facts, by experimental investigation into the conditions of nature's processes, and by the

establishment of laws of connection between the facts ascertained. Their special educational value lies in the training they afford in close patient observation, in apt and fruitful experiment, in the construction of bold yet carefully guarded hypotheses, and in the habit of requiring a solid basis in fact for every general statement about our real world. On the other hand, the mathematical sciences are largely deductive. Their educational value lies in the fact that they train the learner in making his ideas as exact and clear as possible, in separating out simple elementary principles as starting-points, and in insisting on the necessity of rigorous logical sequence in passing from premise to conclusion. Mathematics has commonly been held up as the best instrument for disciplining the mind in exactness and consistency of thought.

Unity of Intellectual Process: Learning and Method.

Combination of Processes in the Acquisition of Knowledge. As briefly indicated above (pp. 87, 88), the several processes considered under "Development of Intellect" are closely conjoined in our everyday concrete mental activity. This has, indeed, been implied in the preceding sections. The mental activity carried out by the Latin scholar in our example evidently comprises quite a number of processes, close observation of words, style, etc., a good deal of mental reproduction, as well as much constructive imagination and reasoning. The higher kind of apperceptual organisation of knowledge clearly illustrates this combination of the several types of intellectual process.

The same close interweaving of observation, mental reproduction, etc., is seen in those modes of acquiring new knowledge, to which we are wont to give the name of *learning*. We have noted that so easy and half mechanical a process as reading a book on a familiar subject involves a number of subtle and complex intellectual processes, including the selection of particular shades of

verbal meaning, the filling in of gaps in the visual presentations and even the substitution of what is imagined for what is actually presented to sight (see p. 194). It has been pointed out, too, that when the mind of a pupil assimilates the ideas presented through a verbal medium by the teacher, there is involved, not only close attention to the words—which is the primary condition of "taking in" what is said—but the co-operation of the processes of memory, imagination and thought (see pp. 254, 255).

The several forms of process which thus co-operate in a complex intellectual activity must not be thought of as a succession of stages, such as one of observation followed by one of comparison, and this, again, by one of explanation. They run on together in intimate connection and interaction. Thus, in the Latin scholar's mental activity illustrated above, further observation quickens imagination and thought, and this quickening, in its turn, gives a new aspect and meaning to what is observed.

Here it may be well to emphasise by repetition the point that the later or higher forms of intellectual activity are ever reacting on the earlier or lower. The generalised forms of knowledge are, indeed, only of real value to us when we again and again bring them to bear apperceptually and explanatorily on new concrete experiences. Thus intellectual development is inadequately described as a movement from the concrete to the abstract *as its goal;* it is a movement from the concrete through the abstract back to the concrete.

Variations of Form in Complex Process of Learning. While all extension of knowledge has these general characteristics, it assumes a variety of forms according to the special character of what is prescribed, and according to its relation to the particular learner's mind. The complex type of process illustrated above, which takes place when sense-experience supplies a new concrete fact, clearly differs to some extent from that which occurs when the mind is suddenly confronted with a new theory—say one of the paradoxes in which certain journalists of the hour

are wont to indulge. In this case—if we take the paradox for more than a joke—the new presentation collides with the apperceptual tendencies arising out of our previous knowledge. We have to scrutinise words, to define meanings afresh, to recall and examine again old experiences and previously established convictions, with a view to a critical appreciation of the claims of the new and somewhat startling announcement. Here the intellectual movement is back from principles to facts, from words to realities. Yet even in this case, too, the mental process may be viewed as essentially an attempt to organise the new with the old and familiar, to bring this and that part of our intellectual stock-in-trade into a consistent and coherent whole.

Psychological Construction of Method: (*a*) Order of Instruction. If psychology is to be of real use to the teacher, we may expect that a clear understanding of the way in which the mind works when mastering new facts or ideas should take us some way towards a theory of method in teaching. Assuming, as has been urged above, that all learning is the result of the learner's own mental activity, we may argue that a teacher will succeed in his work in the measure in which he adapts his mode of presenting a subject to the form which this activity assumes. Hence, the attempts to formulate rules of method based on known characteristics of mental activity. Some of these modestly confined themselves to a few detached maxims, supposed to be of universal validity, such as "Things before words," "From the concrete to the abstract," "From the simple to the complex". The Herbartians went much further than this, proposing one uniform systematic plan of instruction. Thus, as we have seen, they sought to map out the whole curriculum of the school by a reference to a series of culture-epochs (see pp. 86 f.). In addition to this, they endeavoured, in their doctrine of Formal Steps, to ground on their theory of apperception a definite and uniform plan of teaching a subject.

In judging of these attempts to construct educational

methods on a psychological basis the student should recall what was said above (p. 83), on the meaning and value of the maxim, "Follow nature". A method of teaching can never be based wholly on knowledge of mental process, since, as an art, it has an ideal aim, and in seeking to realise this it has to control and to alter the "natural"—that is the unaided—way of reaching knowledge. Thus it has to substitute for disconnectedness connectedness, for fragmentariness systematic completeness, for an irregular and highly wasteful expenditure of mental energy an orderly and economical expenditure.

In securing this methodical procedure the teacher has to place himself at the point of view from which he surveys knowledge as a whole—so far as it has yet reached a precise and systematic form.[1] And he has constantly to refer to this larger "objective" view of his subject-matter, to the place it fills in the whole circle of knowledge, and to its logical connections with other portions *e.g.*, the dependence of chemistry on physics, the interdependence of the history and the geography of a country.

The chief contribution of psychology to methods of teaching is the maxim that at each stage of advance in knowledge a child must have presented to him the kind of material—whether a whole subject or certain selected aspects of a subject—for which he is prepared by his age, his mental capacity, and his previous knowledge and corresponding apperceptive tendencies. The satisfying of this broad condition of educational progress will, no doubt, render the course of things similar, in its larger features, to that followed by the race. Thus the order of *instruction* will tend to approximate to that of *the discovery of knowledge.* Yet any forcing of this analogy will lead us into absurdities. If a teacher had to take a child through all the stages traversed by the race, he would fail to reach the higher planes of *scientific* know-

[1] *Cf.* Keatinge, *Suggestion in Education*, pp. 122-26.

ledge built up in modern times. It would, for example, be impossible to take the learner on to those carefully arranged and carefully safe-guarded processes of inductive investigation by which modern physical science has been constructed. The simple-minded teacher may imagine that he is treading in the steps of the race when by giving an example or two of some principle he claims for his teaching the dignity of an "inductive method"; but the scientific man and the logician know better.

(*b*) **Is there one Method of Unfolding a Subject?** So much as to the process of instruction considered as a whole. When we come to the question how far psychology helps us to find a methodical way of dealing with a particular subject (when a suitable stage of development has been reached) we find again that a mere knowledge of the forms and laws of mental process is not enough. The "objective" or logical connections inherent in the subject itself must have a part in determining the right method of presentation; and these connections become more and more the determining conditions as the age and the capacity of the pupils advance. In opposition to the idea of one uniform type of procedure in teaching subjects, as illustrated in the Herbartian doctrine of Formal Steps, psychology may urge that there is no series of distinct stages in the process of assimilating knowledge such as this doctrine assumes, that the cooperant mental processes are too intricately interwoven to make such a separation of stages of real benefit. To this it may be added that the variations in the form of the process of acquiring new knowledge alluded to above preclude any hard and fast general scheme of method.[1] In determining the best way to deal with a subject—whether in a single lesson or in a series of lessons—the skilful teacher must be allowed a certain scope for that free invention, that adjustive modification of a useful general rule, which is a prerogative of all art. In these innumerable modifications, which can never be reduced

[1] This view appears now to be recognised by some German writers, *e.g.*, O. Messmer. See Adamson, *The Practice of Instruction*, pp. 117 ff.

to the form of definite rules, he will keep his eye at once on the objective goal, that is, the clearest and most highly organised form of knowledge possible, and on the capabilities of the particular group of pupils which he has to instruct.[1]

The point emphasised in the preceding paragraphs, that the several forms of intellectual process, observation, memory, etc., combine in the acquisition of new knowledge has a bearing on the meaning of the word "intelligence" as employed in everyday life and by the teacher. Intelligence implies ability to learn, that is to say, to apprehend and understand new facts and new ideas presented from time to time. Consequently it presupposes a certain completeness of intellectual activity in its several forms: neither observation, nor imagination, nor thought, would alone secure intelligence. And this holds good, whether we are thinking of "general intelligence," that is, of a readiness to master intellectually a large variety of knowledge-material, or of a more special kind of intelligence such as that of the classical scholar, of the chemist, or of the engineer. In every case intelligence is observation, supplemented by imagination, organised into a general form, and supplying an adequate basis for a ready, clearly-discerning apperceptive aptitude, what we commonly name quickness of insight into things, and readiness in understanding them.

NOTE

NOTE A (p. 348).—Very different views have been taken of the desirability of answering children's questions and of reasoning with them. Locke was for encouraging a child's inquisitiveness (*Thoughts*, § 122) and for offering suitable reasons (*ibid.*, § 81). Rousseau, who held that children up to the

[1] On the bearings of psychology on the order of instruction see Herbert Spencer, *Education*, chap. ii.; A. Bain, *Education as a Science*, chaps. vi. and vii. On the Herbartian doctrine of Formal Steps, see James Welton, *Principles and Methods of Teaching*, pp. 69-72; Lloyd Morgan, *Psychology for Teachers* (new edit.), pp. 123-128; and O. Messmer, *Kritik der Lehre von der Unterrichtsmethode*.

age of twelve are not rational beings, was of course opposed to this. George Eliot wisely cautions us against reasoning *too much* with a child. By so doing, she says, "you make him a monster without reverence, without affections". The dissimilarity of the views suggests that we may go wrong here in one of two ways; either by discouraging a range of curiosity and questioning appropriate to the early years, or by fostering a precocious range of inquisitiveness, indulgence in which is likely to be bad for the child—for his brain, if not also for his moral health.

PART III.

THE DEVELOPMENT OF FEELING.

CHAPTER XV.

GENERAL CHARACTERISTICS OF FEELING.

HAVING now briefly reviewed the growth of intellectual activity, we may pass on to trace the second phase of mental development, the gradual emergence and growing complication of feeling or the affective function (compare above, chap. iii., pp. 43, 44).

A feeling, say of grief, is not like a well-defined sensation or perception which we can steadily fix with attention, and which being common to ourselves and to others, lends itself to a more or less exact description. It is shy and elusive even to self-observation, while it is apt to change from moment to moment in a particularly baffling way. As might be expected, experimental psychology has done little to elucidate its subtle features and their changes from moment to moment. Yet even such knowledge as we have of it is of great value. It throws light on the interesting side of human experience, on our likes and dislikes. Again a study of feeling is the necessary foundation of clear views about human happiness, as also of a theory of values, such as beauty and moral excellence.

But feeling is not merely in itself a subject of great importance; it is intimately connected with the other two main types of mental process, the intellectual and the conative. As will be shown presently, feeling is a vital

element in our active impulses and strivings; nor is it less closely conjoined with what are apt to appear the calmer currents of our intellectual life.

Further Definition of Feeling. As we have seen, the psychologist employs the common term feeling to mark off the pleasurable and painful side of our experience. Our familiar comforts and discomforts, joys and sorrows, satisfactions and disappointments, illustrate the prominence of this aspect. These agreeable and disagreeable constituents of our mental life exhibit all degrees of intensity, from the quiet current of satisfaction with which we have to be content during a large part of our daily occupations, up to such rare intoxicating pleasures as a first prize or a first visit to a theatre. Since the terms pleasure and pain as used in everyday life suggest only the more intense and palpable varieties of feeling, it is better in psychology to define feeling as including and marking off all the *pleasant* and *unpleasant* constituents in our experience. By using these terms comprehensively we may say that probably there are no absolutely feelingless experiences, but that they all alike have some more or less distinctly recognisable element of pleasantness or unpleasantness.[1]

We thus see that feeling, like sensation, has the attributes of intensity and quality and, it may be added, the temporal aspect of duration. With respect to intensity little needs to be said. We all know what is meant by a greater or a less degree in the pleasantness or unpleasantness of two tastes or of two colours. The possibility of experimentally investigating simple affective processes depends on the ability of the subject to say within certain limits which of two colours or of two simple outline forms pleases him the more. Some psychologists would add to the opposed pair, pleasantness and unpleasantness, another, namely, quiet and exciting feelings, as illustrated in the contrast between restful colours as blue and stirring colours like red, as well as in the characteristic difference between the quieter

[1] On the question whether there are any absolutely indifferent states, see Stout, *Manual*, pp. 62, 63.

(asthenic) and more exciting (sthenic) emotions, *e.g.*, tenderness and anger (Note A).

Feeling and Intellectual Process: (*a*) Differences between Feeling and Sensation. We have already touched on the distinction between sensation and sense-feeling (see pp. 109 f.). In general the difference is quite clear: we have one mode of consciousness when we merely touch a chair, quite another mode when we inadvertently kick a naked foot against it. How can we best mark off the characteristics of the latter mode of experience? As we have seen, our sensations, especially those of the higher senses, possess certain definite "presentative characters" which fit them to be knowledge-material, *viz.*, degrees of intensity, differences of quality and of local character (see pp. 94, 99). Feeling, though it has intensity, is wanting in definite localisability, and its qualities do not seem to be comparable with those of sensation by the aid of which we construct our perceptions. Another difference insisted upon by some psychologists is that, unlike sensation, feeling cannot be directly attended to, and so made clearer; which circumstance would explain the general vagueness and elusiveness of our affective experience. To these differences of intrinsic character we may add a difference in meaning and use. Whereas our sensations and perceptions are to a large extent a realm of common experience —all duly endowed persons having, for example, similar sensations and perceptions under similar external conditions—feeling is by comparison a variable, and subjective experience, as shown, among other ways, in our dissimilar likings in the matter of colours.

(*b*) **Connection between Feeling and Sensation.** The affective and intellectual processes, though distinct, are most intimately connected. Keeping still to the primary processes of sensation, we may note that everyday language recognises the connection. We speak of the pleasantness of a colour, of a delicious flavour, and so forth; and the psychologist is wont to speak of the "feeling-tone" of a sensation (compare above, p. 92). It is to be observed,

too, that in speaking of sense experiences which have a preponderant affective element, *e.g.*, hunger, we are accustomed to use the two terms sensation and feeling indifferently. A striking illustration of the way in which the two elements seem in certain cases to run together is our way of calling certain cutaneous and other sensations "pains," as if they were merely intense affective elements. Even psychologists are not agreed as to where exactly the line of distinction is to be drawn between sensation and feeling, some marking off certain painful cutaneous and other sensations as pure pains, while others contrariwise are disposed to resolve all feeling into sensation. It seems better to reject each of these views and to insist on the ultimate distinctness of sensation and its affective accompaniment (*cf.* above, p. 44. See also Note B).

How Feeling varies with Sensation. Our everyday experience tells us that the pleasantness and unpleasantness arising in connection with sensations of the special senses vary in certain ways with the intensities of the latter. A bright light gives more pleasure than a dull one; yet if the light be too strong it begins to grow distinctly unpleasant. Experiments have made more precise the relation between the intensity of sensation and of the feeling accompaniment in the case of the special senses. Beginning at the bottom of the scale, we find that a certain minimum intensity of sensation must be reached before there is any appreciable affective element. Above this, pleasantness begins and gradually increases as the intensity of the sensation increases, till a maximum point of pleasantness is reached. Above this point the *quality* of the feeling changes, that is to say, pleasantness gives place to unpleasantness, which in its turn grows in intensity as that of the sensation is further raised. This is the course of variation when, as mostly happens, the lower intensities of sensation have a pleasant accompaniment. But some sensations, *e.g.*, a bitter taste, a grating sound, a malodour, are never pleasant, but are distinctly unplea-

sant even when the sensations are weak. In these cases there is no alteration of affective quality: the "nasty" smell only grows more and more nasty the more we have of it.

A similar course of variation in the affective accompaniment occurs when, in place of growing intensity, we substitute growing duration. Thus a sensation which begins by being pleasant grows when prolonged more pleasant, till it reaches a maximum, after which it becomes less pleasant and finally unpleasant. The same course of variation, so far as rise and fall of the intensity of the feeling is concerned, occurs in the case of sensations which are unpleasant in the early stages.

We thus see that the affective accompaniment of a sensation varies both with the quantity (intensity, duration) and with the quality of the latter. A greater or less quantity determines not only the intensity of the affective element but its quality as agreeable or disagreeable; while a difference of quality also is, in certain cases, *e.g.*, tactual sensations of rough and smooth, attended with a difference of pleasantness and unpleasantness.

These experiments have been carried out in connection with the sensations of the special senses. Whether a precisely similar relation between intensity of sensation and of feeling holds in the case of other sensations we cannot say. The organic sense-feelings are obviously too vague and too little accessible to observation of any kind. But the relation seems to hold of motor sensations, since moderate activity, as measured by rapidity of movement, is pleasant up to a point at which conscious fatigue sets in; and since, further, irregular, jerky movements seem to be slightly unpleasant from the beginning.

Connection between Feeling and Intellectual Processes. When we pass from sensations to perceptions and ideas the difficulty of ascertaining the relation of feeling to its presentative basis increases: the "intensity" of a perception or image is a hopelessly vague idea. But if we turn to the *mental activity* involved we seem to find a

similar relation of the affective accompaniment to the quantity of activity. Attention in general is pleasant in moderation when no such excessive strain is involved as occurs in searching for a very faint star or for an idea which has become dim and shadowy. We appear, too, to find in these higher intellectual processes something analogous to the unpleasantness which accompanies certain sensations even in low degrees of intensity. There are forms of attention which are unpleasant even when the activity is slight, as in a momentary looking at a flickering light or listening to a wholly arhythmic series of sounds. Attention is, as we have seen, essentially a conative process, and when we come to study conation more closely we shall find that a relation somewhat similar holds between effort or striving in general and the resulting agreeable or disagreeable feeling.

Generalised Conditions of Pleasure and Pain. If now we bring in the physiological point of view and regard these various mental processes as corresponding to functional activities of certain nervous structures or organs, we may reach the following generalisation: *Pleasure and pain answer respectively to moderate and excessive amounts of functioning of certain nervous organs.* If, further, we adopt the physiological hypothesis that the moderate exercise of the normal function of an organ, *e.g.*, a group of muscles, is beneficial to the organ, maintaining its efficiency, whereas excessive exercise tends to be harmful and to impair its efficiency, we may restate the generalisation as follows: *Pleasure and pain accompany respectively beneficial and harmful amounts of normal functional activity in the nervous structures engaged.*

It is evident that in thus defining the general conditions of pleasure and pain we have to look upon the case of mental processes which are unpleasant in low intensities as an apparent exception to the general law. What is the exact explanation of the unpleasant effect of sensations of bitter tastes, etc., in low intensities is still a subject of debate. We may, however, conjecture that the type of

nervous process involved in these cases, too, is unfavourable to the efficiency of the structures concerned.

The comprehensive hedonic[1] principle just formulated has to be completed by another less comprehensive one. Disagreeable feeling may appear not only when there is too much nervous functioning but when there is too little. In the case of the bodily appetites, of the motor impulses so strong in the young, and generally of all processes so far as they have a conative factor, the non-satisfaction of impulse due to the absence of a fitting opening for activity, gives rise to that distinctly disagreeable variety of mental state which we call a *craving*. The absence of appropriate outlets for mental activity, too, produces a feeling of discontent which easily grows into *ennui*—a state from which not only a child but even a kitten is liable to suffer. Again, all obstruction of our active impulses is, for the moment at any rate, unpleasant, and in so far as these impulses are normal ones, the obstruction may be supposed to be in the direction of what is harmful.

Effects of Feeling. Our affective processes not only have their conditions, but in their turn give rise to other mental changes. Everyday experience familiarises us with such facts as that pleasurable sensations have an exhilarating effect, painful sensations a depressing effect, on our whole mental state. Recent research has made this empirical knowledge, too, more precise, showing that the nervous process which underlies sensational pleasantness or unpleasantness involves a *diffusion of current* over various remote parts of the organism. This diffusion will in certain cases give rise to secondary sensations which again may have their recognisable affective accompaniments. We have all experienced the cold shiver which certain disagreeable touches and tastes produce, and the warm genial thrill excited by the tones of a rich mellow voice. It has been ascertained by experiment that, speaking generally, sensations with a pleasant or unpleasant ac-

[1] The term hedonic is here used elliptically for pleasure and pain.

companiment are followed by a number of changes in the organism, including movements of the voluntary muscles as well as changes in the organs of respiration and circulation. These organic effects are found to differ in a curious way according as the feeling is pleasurable or displeasurable, though the results of the experiments so far do not make the difference quite clear.[1]

The essential fact implied in the diffusion of nervous currents which accompany pleasant or unpleasant sensations of the special senses is illustrated also in the case of the organic sensations. A sudden painful sensation of cramp produces a wide cycle of effects, including spasmodic contractions of the muscles of face, limbs and trunk.

These facts point to an interaction between the changes occurring at any time in different organs of the body, and between the psychical accompaniments of these changes. At any rate this seems to hold good as between the state of the brain and that of other organs. In a tedious afternoon climb in the Alps the unpleasantness of muscular fatigue induces a mental depression or weariness of spirit; while, reciprocally, the feeling of disappointment on seeing our hotel still far off as the dinner hour approaches increases the unpleasant feeling of bodily fatigue. Mental disturbance through overwork or worry tends, like muscular fatigue, to lower the tone of the digestive organs and induce the characteristic pains of dyspepsia; whereas a happy frame of mind furthers the digestive process and induces the comfortable feeling which accompanies good digestion. Mr. Herbert Spencer tells us in his Autobiography that he found in dining out in cheerful company a considerable amelioration of his dyspeptic troubles. Whether young men and maidens of to-day who eat in the solitude of their lodgings are able to beguile their digestive organs into doing their work properly by reading a novel when they eat may perhaps be doubted.

Further Generalisation of Conditions. If we adopt as

[1] See Myers, *op. cit.* pp. 332-6.

probable the hypothesis that the several organs tend in general to communicate in this way their pleasurable and painful states one to the other, we are able to enlarge the general hedonic principle formulated above. *Pleasure and pain are not merely accompaniments and signs of a state of things which furthers or hinders the efficiency and welfare of the particular organs concerned; but they point to a state of things which favours or hinders organic welfare as a whole.*

The full meaning of these generalisations only appears when we come to consider more fully the connection between feeling and conative impulse. It is enough for the present to recall the familiar truth that we all instinctively tend to retain or prolong a pleasurable state and to get rid of or end a painful one. It follows from this unalterable law of our nature that if pleasantness did not in general coincide with what is good, and unpleasantness with what is bad for us, we should, in the measure in which the correspondence failed, be seeking what is harmful and shunning what is beneficial. In other words, we should be contradicting a fundamental principle of biology that the actions of normal living creatures aim at self-conservation. This supposition is actually realised to some extent in the case of persons who have abnormal and perverted appetites and tastes: we speak of them, indeed, as ill-equipped for the struggle of life.

Limits of Generalisation. We must not, however, adopt this hypothesis as an exact law. There are some pretty obvious limitations to its applicability. It is well known, for example, that we may artificially maintain mental work by coffee or other stimulants up to a slightly pleasurable level after the activity has begun to be excessive—whether for the brain itself or for other organs from which nervous energy and blood supply are being drained off, or for both. In such a case we are not warned at the time of the harmful effect by the serviceable signal of pain, and only learn of it later. Even without the use of stimulants we may be "carried away" at the moment by an excite-

ment which is more or less pleasurable so as to shoot past the danger signal; as when a youth suffers later from over-taxing his muscles or breathing organs in a boat or cycle race. We have in general to beware of the exhausting and injurious effects of the more exciting feelings even when the excitement is distinctly pleasurable.

Another limitation to the validity of our principle must be noted. What is disagreeable at the moment, even when the unpleasantness is considerable, may, so far from being bad for us, be the necessary condition of our reaching a higher level of efficiency later on. A boy who never faces the painful will make but slow progress, alike in mental and in physical development. As a result he will miss the fuller and more varied enjoyment which comes with the increase of bodily strength and mental ability (Note C).

Effect of Change, Variety, etc. The facts given above with respect to the effects of prolonging pleasurable and painful stimulation suggest that full vivid pleasures are confined to the first stages of the mental activity involved. Any one by narrowly watching his mental state as he looks at a fine mass of colour will find that the pleasantness diminishes after a short interval.

A similar decline in pleasantness and unpleasantness occurs when there is frequent repetition of the pleasant or unpleasant activity. Keeping for the moment to the effect on pleasant experiences, we may illustrate it by comparing (with Ebbinghaus) the pleasantness of the taste of a strawberry when it is the first of the season with that experienced after the consumption of many strawberries; or the delight of the spectacle of the Alpine glow the first night in a Swiss hotel with that of the second night, of the third, and so forth. These facts suggest that the higher intensities of pleasure belong to new or fresh modes of activity. In order to avoid a falling off in pleasantness we need to intermit each kind of activity after a short duration, varying it in some way. In other words, we have to introduce change and variety. These generalisa-

tions are hardly more than restatements of the commonplaces of our everyday knowledge.

The effect of such variations of activity on feeling is probably a complex one. Every nervous structure tends to lose vigour when activity is prolonged, and on the other hand tends during a temporary repose to recuperate and so be fresh for renewed activity. Not only so, sensations and modes of consciousness generally are only vivid and full when change is introduced. This effect is probably connected with the conditions of attention, which cannot fix itself long on what offers no change of impression (*cf.* p. 120). To this it may be added that the very transition from one kind of activity to a dissimilar kind seems to introduce a new affective element through the exhilarating consciousness of change; so that the old saying *variatio delectat* seems to be literally true.

Repetition and Habituation. The dulling effect of frequent repetition on the pleasant tone of our experiences appears to resemble that which is found when a habit is formed (see above, pp. 68 f). There is in both cases a gradual diminution of the intensity of consciousness, and an adaptation of the nervous structures concerned to the particular mode of activity which is being repeated. The working of this principle of accommodation is seen still more clearly in the case of repeated unpleasant experiences. In this case we may have, not only the diminution of the unpleasant feeling, but the substitution for this of a pleasant feeling. This transformation is illustrated in the acquired likings of the palate, the fondness for alcoholic drinks, bitter condiments and the rest. In certain of these cases we can see that the adaptation involves a strengthening of the organs concerned, as when motor or mental activity which was at first unpleasant grows into an enjoyable exercise.

One other effect of repeated activity and accommodation on feeling remains to be touched on. What is customary, though it loses the first fresh charm, becomes endeared by habit, so that when deprived of it we suffer. It is owing

to the growth of these recurring cravings that a boy's mental as well as bodily activity becomes firmly set in certain definite lines. He may not find any intense pleasure in the round of occupation; yet the mild craving to do what he is used to do will gently incite him and secure for him in the end a certain quiet gratification.

Standard of the Customary. The principle of habituation just touched on tends further to set up the customary as a hedonic standard for estimating feeling, both pleasant and unpleasant. As we grow and experience begins to consolidate itself, we fall quite unreflectively into the way of determining the value of a pleasure or pain by its position relatively to *the general level* of our affective experience. Those pleasurable experiences count which distinctly rise above the ordinary level of our enjoyments; and similarly those painful experiences seem important which fall well below the average level of our unpleasant ones. For example, the pleasure of a gift—say a book, which will be almost a negligible quantity in the case of a boy on whom such gifts are generously showered, will be quite a considerable one in the case of another boy who is rarely lucky enough to receive a present. Similarly, a blow or an insult, which will hardly ruffle the temper of a boy used to cuffs and bad language, will rouse passionate anger in another to whom such things are comparatively unknown.

We touch here on what looks like an extension of Weber's Law into the domain of feeling. Referring for a moment to sense-feeling, we may say that, since sensational intensity varies proportionally with intensity of stimulus, and intensity of feeling increases (within limits) with that of sensation, there is a rough sort of proportion between intensity of feeling and of stimulus; and now we see that this dependence of intensity of feeling on that of a preceding stimulation may be pushed further. Thus a shilling or a word of praise will count as much or as little for a boy's feeling according as he is ill or well provided with pocket money, starved or pampered in the matter of com-

mendation. Yet we must not expect any exact quantitative results in these attempts to measure feeling. We cannot, for example, say that the increased disagreeableness of the task of copying out lines of Virgil is the same whether we add 10 lines to 100 or 20 lines to 200.[1]

Absolute and Relative Novelty. The peculiar hedonic value which we ascribe to novelty is grounded on the circumstance that all new experiences involve in a high degree and in an impressive form what we mean by freshness of impression and activity. This corresponds in our collective experience to the first thrilling moment in a single experience, *e.g.*, the impression made by the first notes of a song sung by a beautiful voice in the street in the stillness of the evening. The first visit to the theatre, the first tour abroad, are familiar illustrations of the much desired pleasures of novelty. The full delicious experience of perfect novelty is the prerogative of youth. As the years advance, less and less of this novelty flashes its brilliance across our path. Yet the salutary influence of custom comes in to console us. Even if absolute novelty is no longer within our reach, a fair amount of freshness can be secured by relative novelties, that is to say, considerable elevations now and again above the hedonic level of ordinary experience, as in the rare well-timed visit of a busy man to a theatre. In addition to this, the large rhythmical changes of experience, whether determined by natural causes, as those of the seasons of the year, or by plan of life, as those of working days and holidays, bring transitions having something of the vivid freshness and of the special hedonic value of novel experiences.

Affective Contrast: (*a*) Alternations of Pleasant and Unpleasant Feeling. It is evident that in the great transitions just considered we have to do with an effect of contrast. By contrast is meant, in this connection, a sufficient amount of dissimilarity in the quality or intensity of our

[1] On the proposed extension of Weber's Law to economic questions, *e.g.*, the effect of an increase of income on a man's satisfaction, see Marshall's *Principles of Economics*, vol. i., iii., vi., § 6.

sensational and other experiences to secure a peculiar freshening or vivifying effect. Sudden transitions—for example, from light to darkness and from coolness to warmth, or the reverse transitions—strike us, partly by the force added by the transition to the second impression, partly too, perhaps, by a secondary effect, a certain feeling akin to excitement due to the transition itself. Every large and impressive change of surroundings and of correlative experiences gives us this excitement of contrast; so does every considerable movement away from our customary routine activities and experiences.

But the most important part played by contrast in our affective life arises out of the nature of feeling itself, which, as we have seen, moves between the opposed qualities, pleasure and pain, quiet and exciting feeling. It is these oppositions which constitute affective contrast properly so called. This affective contrast may combine with and strengthen contrasts of sensational quality, *e.g.*, in the familiar contrasts, smooth and rough, sweet and bitter. Affective contrast has a wider range in the case of such sensations as those of temperature, which, as we know, are qualitatively modified by antecedent sensations. The transition from an overheated room to one which by contrast seems cool is delightful.[1]

The great transitions illustrated above, *e.g.*, from the term at school to the holidays at home—and one may add *vice versâ* in the case of sensible boys—involve the contrast between what has begun to be stale and so unpleasant and what is fresh and decidedly agreeable. The mere cessation of a pain affects us as a delicious relief, and thinkers from Plato downwards have recognised under the title of "negative pleasures" those which come from the mere escape from painful conditions. A part of the value attached to such transitions depends on the circumstance that our conative impulses move away from the unpleasant and towards the pleasant, so that all transitions in

[1] Some would go so far as to resolve all sensational contrast into affective contrast. See Titchener, *op. cit.*, pp. 59, 60.

this direction give a double satisfaction to the Feelings tendencies, whereas transitions from the r unpleasant are resented as doubly opposed tend for the encies. It may be added that a single sensational ex- to a high degree of pleasantness ged with feeling, being from a high to a low degree of isfactory or comfortable form of this effect of affective contortable one. This fused growth, through comparisons of ness is of the greatest supplies this kind of affective conteeling. Its variations

(*b*) **Alternations of Exciting and** rences of tone of mind contrast arises also out of the other "moody" on the one touched on, that between exciting a" on the other. The rare delicious treat, rising well above arise when acute perience, the rhythmic alternationon, emerge from the strenuous activity—whether called npleasant, and these and the quiet hours at home are exty pains. The organic Our several lives illustrate very disnportant constituent contrast, some—*e.g.*, those of travelle pleasure-lovers and those greedy for ith the sensations tions—being fuller of the exciting pleasuan those aris- but little room for the quieter pleasures, wir contrast lives filled with routine activity have a quiet heare pro- rent broken only by an exciting leap now and agaities of the difference in this case is less than it is popularld dis- to be, since a perpetual round of exciting pleasuts of beyond the reach of mortals, including the robustesse millionaires. Excitement, as such, is not only exhausting, but the enjoyment of it seems to be conditioned by intervals of comparative quiet (Note D).

Varieties of Feeling. Strictly speaking, the only varieties of feeling are those of affective quality and intensity. Since, however, the affective process is always closely connected with a sensational or other mode of experience, one might proceed by distinguishing varieties of it according to the differences among the other processes which condition it. In this way we should classify "feelings" as sensational, perceptual or ideational (or ideal); or, on the other hand, as conative. Such a classification, however, would

sensational a[ct], and would fail to bring out the differences freshening or [ra]cter in our feelings. The most interesting example, from [va]riety of our affective experiences is that warmth, or the reverse [s], such as anger, love. These (as force added by the tran[s]e highly complex states, involving partly too, perhaps, by a[ts] but perceptions and other pro- akin to excitement due our emotions will not fit easily large and impressive cha[f] classification. Nor is this all. lative experiences gives are fused unities, each of which, does every considerable istinctive character and constitutes ary routine activities a[ence]. For this reason they demand

But the most impo[r]- For purposes of convenience we affective life arises [f]- of everyday language and describe which, as we have [s]"; yet in doing so we must re- qualities, pleasure and[guage] is elliptical, and that though is these oppositions [s] strong and prominent in an emotion, properly so called. [uch] more than this element. with and strengthe[n]t of all the varieties of feeling as just in the familiar [o]t possible here. Those which accompany bitter. Affec[t]- the higher intellectual processes will be such sen[t]- later in connection with the intellectual and know, a[s] sentiments. The pleasures and pains of cona- The tra[s] be illustrated to some extent in connection with contra[c]ussion of the conative processes. In this way there

T[r]emain two chief classes of feelings to be considered, [n]ely (*a*) Sense-feelings or those in which the affective process is bound up with sensations, and (*b*) Emotions.

(*a*) **Sense-Feelings.** These have already been referred to above in connection with sensation (see chap. v. p. 109). They fall into two distinct groups: (*a*) In the first, marked off in everyday language as "bodily feelings," the affective process arises in connection with organic sensations, as in the agreeable feeling of bodily warmth, the disagreeable feeling of chilliness or of impeded respiration. They may be spoken of as the Organic Sense-feelings. (*b*) In the second group the pleasant or unpleasant feeling is connected with the sensations of the special senses, including the motor sensations, as the pleasant feeling of smooth touches,

of gentle movement, etc. These may be called the Feelings of Special Sense.

As we have seen, the organic sensations tend for the most part to fuse into a single mass of vague sensational experience. This mass is deeply tinged with feeling, being indeed commonly described as a satisfactory or comfortable state, or as a disagreeable or uncomfortable one. This fused mass of highly affective consciousness is of the greatest importance for the whole life of feeling. Its variations from time to time determine the differences of tone of mind expressed by the terms "depressed" or "moody" on the one hand, "cheerful" or "in good spirits" on the other. The more intense organic feelings which arise when acute sensations, such as a stab of indigestion, emerge from the fused mass are in general decidedly unpleasant, and these experiences constitute our typical bodily pains. The organic feelings will be found to supply an important constituent to our emotional states.

The pleasures and pains connected with the sensations of the special senses are of a higher order than those arising from organic sensations. In general they contrast with the latter in having the pleasant element more prominent than the unpleasant. The greater intensities of these feelings are probably to be found in pleasing and displeasing tastes and odours and in the luxurious effects of certain touches and of gentle motor activity. In the case of the two senses of chief æsthetic importance, Sight and Hearing, the pleasure of mere sensation, apart from attention and perceptual organisation is in general, though a considerable one, less intense. Colours and tones, though singly capable now and then of a profound effect on feeling, owe much of their hedonic value to their finely graded variations of quality and intensity, and to the circumstance that they are capable of entering into complex wholes having a pleasing spatial or temporal form, as illustrated in a well-composed painting or in a beautiful musical composition.

(*b*) **The Emotions: Distinction between Sense-Feeling**

and Emotion. The simplest way of marking off an emotion from a sense-feeling or mass of sense-feeling is by saying that the latter occurs at the level of sensation, whereas emotion occurs only at the perceptual, or, more accurately, at the apperceptual, level. Before a man can be angry he must, it is evident, be capable of perceiving an object and apprehending a special meaning in the object perceived. Emotion may thus be roughly marked off as a feeling which is directed towards some apperceived object.

Yet it is not easy to draw a clear line between the two. Take joy for example. A wave of glad feeling may arise in the morning from many rivulets of sense-feeling flowing from the refreshed and heightened activities of the internal organs, as well as from the play of sunshine and blithe sounds on the two higher senses. This vague massive feeling which we call joy of life (Lebenslust), though having the general characters of an emotion, does not, so long as it remains objectless, conform to the above definition. But it certainly becomes an emotion as soon as it begins to concentrate itself upon some object,—say the pure blue of the morning sky. Similarly, one of those fits of irascible irritability from which Thomas Carlyle used to suffer, though not in itself a complete emotion, became so as soon as the sage gave to his ill humour an objective direction, more or less precise, by denouncing something, whether the neighbour whose cock tortured his nerves, a cordially disliked politician, or only "things in general".

General Structure of Emotion. An emotion, in its simplest form, thus starts from a perceptual process. Its most striking characteristic is its violence and far-reaching disturbance in the psychical microcosm, whether it springs up suddenly or develops more slowly as in the case of Othello's jealousy. An angry man is mastered by his anger: his thoughts no longer move freely, his attention is enslaved, being chained to the object of his perception and the special meaning which this has for him. Besides this, there is in emotion a profound organic dis-

turbance involving the organs of respiration, circulation and more or less the whole muscular system. How is this violent interruption of the normal flow of conscious life, this psycho-physical storm, to be accounted for?

To begin with, there is nothing in the perceptual process to account for the agitation. When, in a stroll in a London street, a violent push from a passer-by arouses a momentary feeling of anger, it is not the perception of his form or of his movement *per se* which kindles the irascible flame: perception properly so called is supplemented by an apperceptual process, the realising of the meaning of the action, and of the unsociable antagonistic relation to ourselves which it indicates. Or, to put it rather differently, the mannerless, ill-tempered behaviour collides with our conative tendencies, our quiet comfortable attitude of pedestrian on a civilised pavement. Similarly, when the sight of a bull at large near us on a Swiss mountain makes us feel "creepy," it is not the mere perception of the particular taural form which disturbs, but the meaning of the proximity of the bull as a situation affecting our security. This meaning will of course be the fuller the more we know about the ferocious character of bulls, and the more numerous and vivid the images of unpleasant experiences which start up in our consciousness. It is this apprehension of a situation, deeply involving our welfare, which excites us, keeps our attention rigidly fixed on the object, and starts that large wave of diffused nerve-currents which makes such a wide-spread organic commotion.

We may say then that an emotion includes as essential parts of its structure (1) a perception coupled with the apprehension of a situation which deeply affects our welfare; (2) two currents of psycho-physical change started by the intellectual apprehension, namely (*a*) a close concentration of attention on the object, and (*b*) a wide cycle of organic effects which involve sensations and their concomitant feelings.

Relation of Perceptual Process to Organic Disturbance. If now it is asked what precisely is contributed by each

of these factors to the emotional state, no answer can be given. What may be the "feel" of the initial stage of perception and apprehension of meaning when danger threatens no one can tell, for the good reason that neither the experience of every day nor that of the experimental laboratory can isolate this initial stage from the secondary stage. The keen fixed scrutinising, together with the correlated movements of puckered eyebrows, etc., and the wider range of organic effects which follow so swiftly, mingle their own sensational and affective consciousness with that of the earlier stage. The poets, if not common men also, speak of these "accompaniments" as closely bound up with the emotion, as when Shakespeare speaks of "a faint cold fear". Modern psychologists have gone a step further, adopting the view that these organic effects, carrying with them new sensations and sense-feelings, are a vital part of the emotional experience, giving it much of its characteristic colouring or flavour. Some, indeed, have gone so far as to say that this organic complex constitutes the whole of the emotion, that fear proper only begins *with* the sickening sensation of the heart disturbance, the "slackened sinews," the "shaking knees," the cold sweat, etc. Yet this is now seen to be a great exaggeration of the importance of the bodily or "somatic" factor in an emotion (Note E). It may be added that the presence in an emotion of a large and characteristic group of bodily processes allows of a certain study of the emotions by a careful measurement of some of their bodily accompaniments.[1]

Hedonic Tones of Emotion. This final complex of processes constituting an emotion has its own affective quality and intensity. Some emotions, *e.g.*, fear, jealousy, are on the whole distinctly disagreeable, others, as tenderness, admiration, are as distinctly agreeable, while others again, as anger, seem to be mixed feelings partly unpleasant, partly pleasant. Whether in addition we should postulate a new unique *affective* quality for the total

[1] See Meumann, *op. cit.*, I., pp. 276 f.

emotional experience is a disputed point. Emotions like fear, anger, tender emotion, are no doubt experiences dissimilar in kind, yet these dissimilarities may be the result of the differences in the sensations and other constituents and the peculiar manner in which these combine (Note F). It is to be added that an emotional state changes from moment to moment, having its rise and fall, and varying within wide limits both in its intensity and in its predominant affective tone.

Emotion and Conative Process. In the initial stage of an emotion conation is present only as a tendency. The exciting perception impinges on our fixed tendencies either as something obstructive of well-being, as in fear or anger, or as something promotive of the same, as in joy or gratitude. It is the apprehension of this unfavourable or favourable bearing of the object on that which we instinctively strive after which determines the feeling tone of the initial stages as disagreeable or agreeable.

The conative factor appears much more clearly in the second stage. If one watches the behaviour of an angry man as

> He frets, he fumes, he stares, he stamps the ground,

we seem to have to do with a mental condition in which feeling and active impulse are inextricably interwoven. So far as these motor reactions belong to the emotional state they will of course affect the total feeling. This is true even of the intensified attention shown in the "stare," which may have something of the pleasantness of energetic activity, or, if baffled, may grow distinctly unpleasant. The other directions of motor activity excited in the emotional state will modify the total feeling by adding new elements. Joy seems to grow as it expresses itself in a large wave of pleasant muscular activity. Anger, too, will swell and acquire a more enjoyable flavour when the body is made more erect, the arms set whirling, the voice inflated, and the stamping and the balling of the fist add a delicious foretaste of the joy of crunching one's foe.

Yet though conative or quasi-conative processes thus contribute to the emotional state, we must be on our guard against a confusion of the two. Feeling and conation, however closely conjoined in our experience, are, as we have seen, two fundamentally distinct modes of consciousness; and in dealing with emotion it is important to distinguish the true conative accompaniments from what is not in the strict sense conative. Thus, much of the activity of the "voluntary" muscles excited during an emotional state has no clearly conative significance. Many expressive movements, such as the smile of pleasure and the cry of pain, involve—in their early unsophisticated forms at least—as little of the conative factor as the quickened breathing in anger.[1] It is of course not always easy to draw the line here, and the difficulty increases as life advances, as when a child learns the trick of prolonging, if not also of beginning, his whimpering with some conscious intent, or when a maiden learns to bring on the correct nuance of the social smile when a visitor calls.

That emotion is independent of its conative accompaniment is illustrated in the large variation in the amount of the latter. Emotions of the sthenic or energetic class, like anger, have when fully developed a rich escort of conative impulse which seems inseparable from them. On the other hand, the asthenic or quiet emotions, *e.g.*, tenderness, are relatively passive states. The heavenly bliss of the small girl who is allowed to sit by and hold the hand of some adored teacher or other adult is an emotion *pur sang*. More than this, one and the same emotion will exhibit striking differences in respect of the amount of its conative accompaniment. There is the fear which watches and prepares, as well as the paralysing fear which incapacitates us even for running away, and is, moreover, the fuller emotional experience. Indeed there is much to

[1] Considered biologically with reference to their origin in the race, expressional movements may be viewed as survivals of actions which were once carried out consciously as useful by our ancestors. See Darwin's *Expression of the Emotions*, chap. i.

favour the view that the wide diffused nervous currents which answer to emotional excitement are in their more energetic forms antagonistic to those restricted discharges which underlie the conative processes of motor adjustment to the situation of the moment. Children's agitating fears gradually give place to "fears" which are emotionally weak, while the conative tendencies are strongly marked (Note G).

Emotional and Intellectual Processes. Not only is emotion determined by an intellectual process: when fully excited it reacts powerfully on the intellectual processes of the moment. It may help to revive perceptions. In the case of a concrete experience which has a vivid emotional factor, *e.g.*, waiting in a dentist's reception-room, this factor may become a new and powerful medium of associative revival. In subsequently thinking of the unpleasant anxious situation we find ourselves able to recall with startling vividness a number of objects in the room, books, wall-paper, etc. This shows that the original emotional state tended to give peculiar vividness to the perceptions of the moment and to associate itself with these in a particularly close manner. In addition, an emotional experience frequently aids the reproduction of our experiences by recalling a similar emotional state, as when some landscape seen abroad reminds us of a familiar one quite as much through some similarity in the shade of feeling excited as through any resemblances in the perceived objects themselves.

Again, emotional states may exercise a powerful modifying influence on the particular ideational tendencies of the moment. So long as an emotional state persists, it acts on the flow of images and ideas restrictively and selectively by favouring the clear reinstatement of those which have an affective accompaniment chiming in with its own tone. This is illustrated by such familiar facts as the tendency of the frightened child to see suggestions of danger in the most harmless of objects. All prejudiced views of things, as distinguished from calm

and impartial ones, illustrate the same restrictive and deflective influence of emotion on the flow of ideas. The dominant emotional state acts here, not only by preferentially calling up ideas with congruous feeling tones, but by constituting for the moment a supreme interest which masters the attention. Another illustration of this influence in a less violent form is met with in the sequences of images and ideas adopted by the poet, as when Keats gives us one of his "trains of peaceful images".

Varieties of Emotion. As our common language shows, there is a large variety of emotions, some widely dissimilar, as tenderness, fear and anger, others closely akin, as jealousy and envy. No generally accepted classification of emotions has yet been made, and this is not the place to attempt so difficult a task.

One ground of distinction is so clear and so important that a word must be said about it. As already implied, the emotions so far touched on are simple and instinctive, involving as their basis *congenital dispositions* to react in the particular ways characteristic of the several emotions. Most of these at any rate appear early in child life, and some at least appear also in a well-marked form in animal life (Note H). These may be called Primary Emotions. Among them may be instanced simple forms of gladness and joy, and of grief and sorrow, which arise in the main from the pleasures and pains of the organic sensations, together with those of the sensations of the special senses, and involve only rudimentary processes of perception and imagination. We may instance the gladness of the child when the play hour comes, the grief which follows a nasty tumble. With these must be taken the emotions with a more specialised mode of reaction and flavour, such as fear, anger, tenderness (towards animal pets as well as human beings), vanity, gregarious sympathy. How many distinct types of primary emotion we need to assume for scientific purposes is a point not yet determined by psychologists.

From these Primary Emotions we mark off the Second-

ary Emotions which are developed later both in the race and in the individual, appearing only at the ideational level. These are in general complex and take up primary emotions as elements, modifying them in various ways. They will be discussed in the two following chapters.

Early Development of Feeling.

Characteristics of Children's Feelings. As already noted, the element of feeling has a preponderant place in the early stages of the mental life. This preponderance is impressed upon us by the direct and energetic character of the expressive reactions. A little child expresses both misery and joy instinctively, and with as little of restraint as of impulse to simulate the expression of feeling. Hence the comparative ease with which this side of our mental life may be observed in the early years.

The fact that the earliest experiences of pleasure and pain grow out of changes in the organic life, suggests that the painful quality of feeling is likely at first to be the more distinctly marked. During the first weeks, at any rate, bodily disturbances are apt to be a chief cause of the intenser feelings.

About the age of three or four months the special sense-feelings begin to become prominent, and a young child finds in new sensations a luxurious enjoyment which is lost in adult life. Harriet Martineau tells us of the exquisite delight which she experienced when about three years old in passing her fingers round a button covered with black velvet on the top of a sister's bonnet.[1] The same is true of the affective accompaniments of certain sensations of colour and tone. Recent experimental inquiries show that children between the ages of seven and fourteen have very decided preferences in the matter of colours, the favourites being blue, red and gold. It is found further that they clearly prefer the combinations of colour which are preferred by adults, *viz.*: those approximating to con-

[1] *Household Education*, chap. xxi.

trasting pairs. Inquiries into preferences as to simple linear forms have so far proved much less decisive (Note I).

The development of muscular activity, involving locomotion and a freer use of the hands, opens up a larger field of agreeable and disagreeable experiences. The inexperienced inhabitants of the nursery illustrate at once the joyousness of full normal activity and the unpleasantness of over-activity. They show us no less distinctly the craving for novelty and generally for exciting pleasures, though they begin to make acquaintance with the quieter pleasures also. Since, too, they are at once eager for activity and fond of change and novelty they illustrate in a striking manner the disagreeable results of monotony of surroundings and of the closing of the channels of activity.

As implied above, children, as soon as perception is sufficiently developed to allow of simple emotional states, are apt to display their fuller intensities: they express in a quite unmistakable manner the germ of anger ("temper") and fear within the first year, as well as of other more amiable feelings, *e.g.*, tenderness.

This early subjection of feeling to sensations and perceptions may help us to understand other characteristics of children's feelings. What at once strikes us in their manifestations of pain and pleasure is the quickness of the affective reaction. They are excitable in the sense that they are readily moved to joy and to grief, to laughter and to tears. The same swift emotional responsiveness has been observed in savage races.

The presence of the simpler animal emotions in children leads to the appearance of a good deal of violence and masterfulness. The outbreaks of childish temper are, in their stormy violence and their complete mastery of the mind, unlike anything that occurs in later life—at least in the case of those who have learnt to govern their passions. This turbulence of emotion, like the quickness of its responses to excitants, is clearly explained by its instinctive

force, and by the absence of the reflection and self-control which later on serve to moderate feeling. To a child the present enjoyment, the present sorrow, is all-engrossing because he is dominated by sense, and can neither look forward nor backward beyond the actual experience. As George Eliot puts it: "Childhood has no forebodings; but then it is soothed by no memories of outlived sorrow".

With this violence of childish feeling there goes another characteristic, its fugitiveness. This is for parents and others the redeeming aspect of childish passion. There is something almost amusing in watching the storm suddenly calmed by some small change in the environment, as a new movement of "kitty," which at once diverts the attention. This liability of early emotion to cease suddenly is another consequence of its subjection to sense-stimuli: it is some new attraction in the surroundings which thus magically puts an end to the misery.

The same dependence of children's feeling on the surroundings of the moment may help us to understand another of its characteristics, *viz.*, its capriciousness. They have not yet begun to consolidate feeling into permanent emotional attitudes, whether likes or dislikes. To-day the small boy is full of caresses for his nurse or his toy-animal: to-morrow his mood flies round to the other pole, and he heaps abuse on his favourite—here again exhibiting his kinship with the savage and people in a low stage of culture.

Educational Control of Early Stages of Feeling. It is recognised by the best writers on the subject that education is deeply concerned with the feelings of children. No education is worthy of the name which does not seek to exert a profoundly beneficial influence on a child's feelings; and this, both because of their intrinsic importance as constituents in his happiness, and because of their close connection with his intellectual and moral development.

Action of the Educator on the Feelings. When we are dealing with mental processes which are apt to be so

obscure and withdrawn from others' observation as feeling we may well ask what means are at our disposal. We can set an object before a boy's eye and so stimulate his observation; we can hold out a prospect of reward and so excite his conative impulses. But how are we to set to work, for example, if we wish to excite an emotion of pity or of shame when this seems to be wanting? Yet every-day observation shows that children's feelings are to a considerable extent under the control of those with whom they live; and we have to inquire into the means by which this influence is exerted.

It must be conceded that this action of education on feeling is largely indirect. Thus we can modify the feelings by changing the environment. The introduction of a suitable companion to a lonely child, of an older to a younger schoolboy—*e.g.*, Tom Brown to the shrinking youngster, Arthur—may have a profound effect on happiness as well as on character. The educator himself, as a prominent and powerful personality in the child's environment, shares in this influence, and can direct it to the best results. Not only so—and this is probably the most important influence—education works upon the life of feeling by developing those systems of ideas which nourish and sustain the higher forms of feeling, *e.g.*, historical ideas as illustrating our indebtedness to the labours of our ancestors. On another side, as we shall see later, a powerful restraining action on feeling is effected by way of moral education, through the training of the young will in self-control. A more direct influence comes in through the action of the personality of the educator, in calling the child's attention to what is mean and base, or worthy of admiration, and in expressing clearly and impressively his own feelings—his likes and dislikes, his admirations and contempts.

Need of Studying the Conditions of Feeling. The beneficial action of the educator on a child's feelings implies attention to the general conditions of pleasant and unpleasant experience. We must remember that a child's

lasting happiness is hindered rather than furthered by a too lavish indulgence in pleasure. Certain pleasures of sense, especially those connected with appetite and the palate, have to be kept within limits, if only for hygienic reasons. "Spoiling" children by rushing them too early into adult pleasures, *e.g.*, as in taking them to the theatre, to the Swiss Mountains, and what not, is in its lasting effect unkindness. We should rather accustom a child to spells of activity which promise only the more quiet sort of pleasure; also to exercise him in self-adaptation to what at first is or looks unpleasant, *e.g.*, in the matter of food. Freshness of enjoyment should be secured by judicious alternations of activity, and by occasional treats separated by adequate intervals of quieter pleasure.

We may pass now to the special affective conditions desirable in connection with school work. A state of intense pleasure involving excitement is of course precluded.[1] Again, it follows from what has been said that the idea of making learning pleasant, which we owe to Locke, does not mean that every part of it should at once prove enjoyable to the learner, and that nothing unpleasant should be introduced. The teacher is right in insisting on the proper amount of exertion, even though it may at the moment feel irksome. A similar line of remark applies to the use of the principle of change or variation. We do well to beware of that monotony which has been called "the greatest enemy a teacher has to deal with". Yet while the teacher has judiciously to meet and gratify a child's craving for freshness, *e.g.*, by varying his way of putting and illustrating things, he must not allow himself to be dominated by this craving. Some "dull repetition" is needed for that firm grip of the elements which is a condition of a fuller knowledge of the subject and of the higher enjoyment which comes with this. All good work, even that of children, implies something of dogged persistence in effort when pleasure no longer lures.

[1] Meumann points out that emotional excitement is unfavourable to learning. (*Experiment. Pädag.*, ii., 37).

Another principle which can be made good use of by the skilful teacher is that of Suggestion. Children show their suggestibility in the way in which their likes and dislikes are modified by others' talk. Locke shows that he knew the action of this principle in his shrewd remark that occupations which would otherwise seem arduous and even repulsive to a child may be made to look inviting when they " insinuate themselves into them (the children) as the privilege of an age or condition above theirs ".[1] That very astute boy, Tom Sawyer, put this principle into practice when he got his comrades to relieve him of the task of whitewashing the fence, by suggesting that, so far from being drudgery, it was a glorious artistic achievement which only the privileged are allowed to undertake.

As a last illustration of the educational application of hedonic theory, we may point out the importance of making the stimuli we need to apply, whether pleasurable or the opposite, proportional not only to the sensibility of the individual child—so far as this can be ascertained—but to the general level of his previous experience, giving, for example, sufficient, yet not too much, encouragement or praise to make it effective as an additional spur to effort.

Restraint of Violent Feeling. It is a commonplace that in the early instinctive feelings the educator is confronted with adverse forces which need to be brought under restraint. Outbursts of angry passion, for example, have to be controlled, partly because of their physical and moral injuriousness to the child, and partly because they disorganise the intellectual processes and so thwart all efforts to instruct.

The work of subduing the turbulence of feeling in the first years of life is in some respects a peculiarly difficult one. When a feeling of fear is violently excited little can be done at first in the way of checking its force. Yet even at an early age something should be required in the way of self-control, a process to be dealt with later on. For

[1] *Thoughts on Education*, §§ 76 and 129.

the rest, a passionate child must be treated with a certain protective tenderness, care being taken that he is not exposed to such an amount of provocation as his feeble powers are incapable of resisting. Education will, further, aim, as the child develops, at moderating the force of these passions by exercising him in reflection. In this way, for example, the early groundless terrors, dread of the dark and the rest, will be mitigated and tend gradually to disappear. Similarly, the violence of childish grief may be reduced by a little exercise of comparison and judgment which will disclose the true proportions of the child's calamity.

It is, however, not only the violence of the early emotional outbursts which calls for the educator's corrective touch. The insidious influence of the less violent kind of anger, of jealousy, and of other unlovely feelings on the child's mental processes and moral attitudes needs to be watched and counteracted. This is perhaps the most difficult part of our problem. We need patient watchfulness and an intelligent insight into some of the mysteries of individual temperament before we are in a position to grapple successfully with these obscure influences of feeling.

Positive Culture of Feeling. Yet even in the earliest stages the educational control of feeling is never merely negative or repressive. Among the first emotions to show themselves are germs of some of the most valuable allies of the teacher, *e.g.*, tenderness, wonder, the joy that comes from activity and from a first taste of power. And, as we shall see later, even the strong passions, anger and the rest, have their important function; and the wise teacher, instead of trying to get rid of them as things wholly bad, will seek to modify them and transform them into valuable elements of character.

The development, rather than the repression, of feeling should be regarded by the educator as his aim throughout. In seeking to repress what is undesirable he will endeavour, not to eliminate all feeling, but rather to substitute for a lower and poorer kind of feeling a higher and worthier

kind. Such a *positive culture* of feeling grows directly and naturally out of instruction, since such subjects as history and literature make a large appeal to the better feelings, *e.g.*, pity for misfortune, indignation at injustice and admiration of bravery. The teacher's personal influence, too, should directly further this positive culture of feeling; for, in the measure in which he secures the respect, admiration, and affection of his pupils, his own modes of feeling will act as powerful stimuli on their emotional sensibilities, calling forth sympathetic responses, and tending to assimilate their ways of feeling about things to his own. Once more, the teacher can promote the development of feeling indirectly by opening up to the child new lines of activity and modes of experience, through which the range of feeling will be enlarged, as when new modes of intellectual activity or of social co-operation are introduced. He can, too, encourage a boy to strike out such new lines of activity, by employing *suggestion*, and awakening in him not only desire for, but a belief in the possibility of attaining a wider range of pleasurable experiences.

NOTES.

NOTE A (p. 361).—On the question whether feeling has other qualitative differences than that of pleasant and unpleasant, see Wundt, *Outlines of Psychology*, translated by C. H. Judd, p. 92; Royce, *Outlines of Psychology*, chap. vii., J. R. Angell, *Psychology*, pp. 258 f., and E. B. Titchener, *Lectures on the Psychology of Feeling and Attention*, Lecture IV.

NOTE B (p. 362).—The student who wishes to read more on the characteristics of feeling, its independence and its relation to sensation, may consult Stout, *Manual of Psychology*, bk. ii., chap. viii., E. B. Titchener, *Lectures*, II., III., a recent article by Th. Ribot, "La Conscience Affective," in the *Revue Philosophique*, April, 1909, and C. S. Myers, *Text-book of Experimental Psychology*, chap. ii.

NOTE C (p. 368).—An interesting question in the biological theory of pleasure and pain is how far there is a correspondence, in respect of what is

pleasant and beneficial to the organs concerned, in the case of organs which are physiologically continuous and appear to have the relation of sentinel box to fortress, more particularly, the palate and the digestive and other organs affected, by what passes into the organism. (See above, p. 97.) Yet the question has very little psychological importance. Prof. Stout touches on this point in his *Manual*, p. 240.

NOTE D (p. 373).—The expression "affective contrast" has been used in a wider sense so as to cover transitions from one emotional state to another and opposed state; *e.g.*, from the joy to the grief of love, or the converse; from love to hate, and back again, in jealousy. See Ribot, *La Logique des Sentiments*, pp. 13 ff.

NOTE E (p. 378).—Almost every recent work on the psychology of feeling has thought it proper to discuss at length the stimulating hypothesis put forward by Lange and James that the organic (including motor) accompaniments of anger and the rest constitute through the sensations arising (and apparently their affective associates) *the whole* of the characteristic part of an emotional experience: that grief, for example, would not only be profoundly modified by cutting off the tears, the sobs, etc. (as Bain and others have emphasised), but that it would evaporate altogether, leaving only a dry intellectual deposit. It seems hardly necessary to discuss this idea further. Those who wish to know more about it can consult W. James's account of Emotion in the *Psychology* or in the larger work *Principles of Psychology*, and the criticism of it by Stout in the chapter on Emotions in his *Manual*.

NOTE F (p. 379).—It is a nice question whether anger, fear and the rest have each a unique affective quality (besides pleasantness and the other qualities indicated in the text). The student who has the time and the courage to attack this point may consult Stout, *Manual*, bk. iii., chap. iv., § 4.

NOTE G (p. 381).—As was pointed out above (p. 112, footnote), the identification of an emotion with the connected conative process has recently been carried to its extreme point by W. McDougall in his interesting and very suggestive work, *Introduction to Social Psychology*. This writer goes so far as to suggest that in what are commonly known as instincts conative tendency and emotional reaction are always conjoined, being indeed but two parts of one complex process. (See chap. ii., pp. 28 *seq.*; and chap. iii.)

NOTE H (p. 382).—The chief exception to the rule of an appearance of the emotion in the first years of life is the sexual emotion, the feeling for the

attractions of sex, which so far as it has its root in sexual sensation and appetite, is of course instinctive, though it require years for its development and frequently appears after the period of adolescence has been passed.

NOTE I (p. 384).—See Meumann, *Experimentelle Pädagogik*, i., pp. 282 *seq.* The experiments of Meumann and others referred to here suggest that girls have more feeling for colours; boys, for simple forms.

CHAPTER XVI.

EMOTIONS AND SENTIMENTS: (A) CONCRETE AFFECTIONS.

In the last chapter we have dealt with the sense-feelings and the early instinctive emotions, that is to say, with feeling at the sensational and perceptual levels of mental development. We have now to examine briefly the forms of feeling which appear at the higher level of ideation. This part of the subject may be opened up by a fuller account of two processes already touched on, namely, the revival and complexity of feeling.

Revival of Feeling: Ideal Feeling. By a revival of feeling in its simplest form is meant the affective process which accompanies the mental reproduction of some pleasant or unpleasant experience, as when we recall a pleasant tune or an unpleasant dental operation. The feeling will, in general, have the affective quality of the original feeling, but will be weaker than this.

In this case, too, the relation between the presentative and the affective factor, *i.e.*, the image and the revived feeling, is not perfectly clear. To begin with, it has been questioned whether in these cases we ought to speak of a recalled or remembered feeling—of an "affective memory," or not rather to regard the later feeling as a new effect of the memory-image.[1] It is certain, at any rate, that feeling may be reinstated without any correspondingly full reinstatement of the experience of which it formed part.

Revived feeling is commonly spoken of as *ideal* feeling,

[1] On the hypothesis of an affective memory, see Th. Ribot, *Psychologie des Sentiments*, 1ère part., chap. xi.

that is, feeling which accompanies an image or idea, instead of an actual sense-experience. "Ideal feeling" is, however, a much wider term than revived feeling, if we understand by the latter the feeling which enters into a process of reminiscence (see p. 231). It includes other forms which exhibit important modifications of character. Even a recalled feeling, *e.g.*, the enjoyment of a time long past, is transformed, in so far as it is apt to be modified by the attitude of regretful retrospect. Another kind of modification occurs when the ideal feeling is projected into the future, as when, on a hot summer day, we anticipate the pleasure of a cool bath. In this case the modification is due to the tense active attitude of expectancy into which it enters.

A specially interesting variety of modified ideal feeling is that which appears in perceptual meaning. When, for example, on entering my room on a cold night I enjoy the pleasant aspect of the fire, I have not a distinct anticipation of warming myself, still less, a recollection of some past warming. In this case the "trace" of past agreeable sense-experiences has somehow managed to transform itself into an apperceptual element, a particular aspect of the object now perceived (*cf.* above, p. 171). A similar process of ideal modification of feeling is seen in the development of personal likes and dislikes through some association with pleasant or unpleasant experiences. This is illustrated in such familiar experiences as the acquirement by a country-bred ear of a liking for the cawing of rooks—a sound intrinsically unpleasant rather than pleasant, and by children and older persons too of likes and dislikes for certain faces. In all such cases there is no recalling of the past pleasant or unpleasant experiences out of which the ideal forms of feeling have arisen. All that we can say is that affective elements of experience have become transferred under an ideal form to percepts, undergoing modification in the process.[1]

[1] For a further account of this process of affective transference, see *The Human Mind*, ii., pp. 78 ff., Ribot, *op. cit.*, 1ère part., chap. xii.

The revival of emotion differs in one important respect from that of sense-feelings. Since it has, as a chief constituent, a mass of organic sensation and feeling, and this recurs, though in weakened form, when the emotional state is imagined, the "ideal" emotional state is apt to approximate to the "real". In recalling a rich musical enjoyment, *e.g.*, the last hearing of Joachim in the Kreutzer Sonata, the original experience may seem almost to repeat itself through the intensity and volume of the bodily thrill. It is probably this organic thrill which has much to do with the real fear, love, etc., which, according to the testimony of some actors, is apt to accompany the dramatic representation of an emotion.

The revival of feeling, like that of sensations and perceptions, may be simply reproductive or may involve a modification and adaptation of a past affective experience. When reading of a thrilling Alpine adventure, a boy tastes something of the awful joy by enlarging and reshaping his own smaller experiences of danger. This ideal adaptation of emotional experience is the fundamental process in the sympathetic realisation of others' feelings.

Complexity of Feeling. In a strict sense, all feeling is complex (see above, p. 365). As ordinarily understood, complexity of feeling involves two or more distinguishable sensational or other feelings, as when we listen to two voices, or experience at the same moment the two emotions of pity and amusement, or pity and contempt. Even pleasantness and unpleasantness are not infrequently experienced together, as in the taste of a dish which mixes slightly disagreeable with agreeable flavours, or in the perception of a pretty and ugly feature in the same face. In all such cases the affective elements tend to modify one another in some way. It is still a disputed point whether in the case of a mixture of pleasant and unpleasant feelings both are experienced at precisely the same moment, or whether now one now the other becomes predominant.[1]

[1] The student who desires to know the different views on these mixed feelings may consult Titchener, *Lectures*, pp. 45 ff.

Complexity of feeling is largely dependent on an expansion of the revival and ideal modification of feeling considered above. It is only at the ideational level, after objects have begun to gather numerous pleasant and unpleasant suggestions, that our emotional life takes on its higher degrees of complexity. The complexity of an outburst of love on seeing a cherished relative or friend after a long separation implies numberless affective memories.

Development of Single Emotions. As we saw in the last chapter, the simpler emotions, such as anger and fear, have an instinctive or congenital origin. This means that after a child has been hurt by a dog, the re-appearance of the animal will instantly evoke the specific attitude of fear. It may even assume a yet more completely instinctive form, as when a kitten shows alarm or anger on the first approach of a dog, before experience has shown it to be harmful. This impulse to react in a definite and specific manner, whether after or before individual experience, implies in the nervous system of child or animal organised arrangements by which the processes excited in the cortex are instantly followed by a discharge along efferent nerves to the vital organs and to the voluntary muscles engaged in the reaction.[1]

While these emotions appear as instinctive reactions, they begin at the outset to be modified by experience, fear, for example, growing less vague, and including some rudimentary anticipation of a definite kind of harm. The complexity and depth of the emotion will also increase through the play of the forces of revival, which will include the faint reverberations of many previous similar experiences. A child may dread darkness more the third or fourth time than the first, partly through dreading, so to speak, his previous dreads, and partly through the cumulative effect of his own morbid fancies. This deepen-

[1] On the question how far children (prior to experience) have instinctive fears called forth by particular varieties of sense-presentation, *e.g.*, the form of a dog, see *Studies of Childhood*, pp. 207 ff.

ing of the emotional experience will, it is evident, tend to counteract the moderating effect of habituation (see p. 369). As George Eliot remarks " Our delight in the sunshine on the deep-bladed grass to-day, might be no more than the faint perception of wearied souls, if it were not for the sunshine and the grass in the far-off years which still live in us, and transform our perception into love ". Similarly, the boy who is frequently teased adds vague memories of past annoyances to the present one, and so has to bear the burdensome consciousness of being the butt of the teaser. The hardening effect of familiarity and habit on feeling is often less than it looks.

Other characteristics of the process of emotional development can only be barely alluded to. With growing complexity there will be, as the ideational processes advance, growing range of excitation. In this way, for example, anger, instead of being aroused only directly by a perception of personal affront, may be aroused indirectly by the memory or imagination of one; also by the apprehension of an actual or a possible attack on some one dear to us. The fears, angers and other emotions of a cultivated adult are largely the result of such an indirect, circuitous mode of excitation, and as such are less intense and more refined feelings. The extension of range of excitation will, further, favour the differentiation of emotion. The ideal fears, angers, etc., excited by a thrilling story differ from those excited by situations of personal danger. Differentiation of emotion is aided still more by the modifications which a feeling undergoes when taken up into one of the sentiments to be spoken of presently.

Development of Sum of Emotions: Lower and Higher Emotions. While, as we have seen, certain emotions are primary, appearing early, and being independent of others, some appear later and presuppose a certain development of the primary ones. By making lateness of appearance, complexity, and relative dependence on earlier forms, the criteria of height, we may roughly sketch out a hierarchy of emotion. Thus fear, sympathetic tenderness or com-

passion, and the reverent feeling for duty may be said to represent three levels of emotion, belonging to well-marked stages of mental development.

In speaking of the complexity of the higher emotions we must be on our guard against an error. Although the higher feeling may take up lower ones as its constituents we cannot view the former as derived from the latter by a mere process of combination. Psychical fusion involves a modification of the elements united and the production of a new kind of experience (see p. 395). Such modification is, as we shall see, particularly clear in the case of a combination of emotions. Hence we cannot, strictly speaking, describe the higher as derivative emotions, but only as later or as secondary ones.

Sentiments.

Fixation of Emotional Dispositions. Emotional development is much more than the multiplication of passing waves of anger, pity and the rest. It implies the organising of emotion as material into a higher sort of product, a permanent attitude of mind such as we mean by an "attachment" to a friend. It is the great merit of Mr. A. F. Shand to have first clearly indicated the importance of this organisation of emotion into what he calls *Sentiments*, and in the remainder of our study of feeling we shall be closely following his teaching.[1]

A single emotional experience, though it has a certain duration, is essentially a transient state. From this we must distinguish a *disposition* to feel anger or what not. This disposition is, as we have seen, in part instinctive. But the congenital germ of the disposition becomes strengthened and fixed by emotional experiences themselves.

A disposition, in this fuller sense, may appear only as a

[1] For Mr. Shand's account of the Sentiments, see an article on "Character and the Emotions" in *Mind*, N.S., v., pp. 203 ff.; also an article on "M. Ribot's Theory of the Passions" in *Mind*, xvi., pp. 477 ff., *cf.*, Stout, *Groundwork of Psychology*, chap. xvii.

short-lived mood, due largely to a prolongation of the deep organic disturbance involved in an emotional outburst. Marion Crawford speaks somewhere of an Englishman's anger settling into a "comfortable ferocity". Again, a temporary condition of health and spirits may constitute a mood or temper favourable to the appearance of a particular emotion. Sleeplessness, by depressing the whole bodily and mental tone, is apt, even in the case of "the philosopher," to generate an irritable mood; and Mrs. Thomas Carlyle was consulting her own comfort hardly less than that of her illustrious husband when she concentrated her mind on the ticklish problem of silencing the neighbours' cocks and dogs.

More important than such relatively temporary dispositions are the permanent ones set up as the result of many repetitions of an emotional experience. The boy who gives way again and again to angry outbursts tends to develop a quarrelsome disposition; which means that slighter provocatives will henceforth suffice to rouse the passion. This result is indeed merely an illustration in the domain of feeling of the homely principle that "exercise strengthens faculty".

Once more, if a boy is annoyed again and again by another boy and can afford to give way to his anger, a more restricted disposition is developed, namely, a quarrelsome attitude towards this particular offender. Dogs as well as boys fix their angry propensities on certain persons, as the harmless postman, or the tradesman's errand boy with a provoking whistle.

Now there is an important point of difference between the fixed angry attitude of the boy and of the dog. While the latter develops only a liability to react in an angry outburst when the persecutor appears on the scene, the boy develops towards him a fixed and continuous attitude which is independent of the presence of the object. He goes beyond this and that particular annoyance and conceives of the annoying *person*, for whom he cherishes a hearty dislike. In other words, he develops a simple kind of *sentiment*.

Sentiment as Organised System. This development of a simple attitude of hostility has been selected as illustrating the importance of the element of fixity of emotional disposition in a sentiment. Yet the latter involves more than fixity, namely, diversity of elements and organisation of these into an unity. Even the simple-looking attitude of hostility towards the persistent troubler includes a number of emotional constituents; for example, the tendency to rejoice when the troubler himself gets into trouble, and to feel chagrin when he flourishes as a green bay tree. Again, even if courageous and consequently able to enjoy the combative situation, the victim is hardly likely to escape the disagreeable feeling of insecurity; and "in time we hate that which we often fear".

Love as Type of Sentiment. It is, however, in the case of more pleasurable types that we can best study the complexity and the organisation of a sentiment. These may be described as varieties of Love, using the term widely so as to include all strong and enduring likings. All love, say that of a boy for his mother or "chum," is based on the emotional experience called joy. Unlike what we hate, what we love gives us pleasure when present, so that we seek to draw it and hold it near us. On the other hand, the felt absence of the beloved object brings something of sorrow or sadness. Again, to love is to attach ourselves to the object, to regard it as necessary for us; and so when it is lost we are overtaken with the more violent emotion of grief; when a loss is threatened, with fear; when another would rob us of it, with anger, and possibly jealousy also. Love is thus a system into which various emotional tendencies are taken up, their modified forms and their modes of excitation being determined by the circumstance that they have their place in this system. Thus the joy of love differs from a simple emotion of joy partly because it is excited only by the gratification of a sentiment, and partly because as a love-joy it is affected and modified by the other constituents of the system. In like manner the joy, fear, etc., of love differ from the same

emotions when they belong to a sentiment of hate. These systems, it may be added, may be as short-lived as a young girl's passing fancy, or as permanent as the love for a good father which extends through life.

Sentiment and other Systems. There is a certain analogy between sentiments and the apperceptive systems considered above, and more particularly that of classification. In love we have the supreme emotional principle, the love itself with its idea of some kind of value, and subordinate to this the particular emotional tendencies, joy, sorrow, fear, etc. Yet the analogy between the two types of system is partial only. A sentiment, as such, is a-logical, and may be anti-logical. The blindness of love, whether for wife, child or country, is proverbial. This means that a sentiment, just because it is organised emotion, strives to maintain itself against all attacks and so against facts and arguments which tend to lower the value of its object (compare above, p. 381).

In a much closer way the system of emotional tendencies which we call a sentiment is allied to the conative system of co-ordinated impulses and ideas which subserves a practical end. That which we love we desire, not only to retain, but to maintain and further. The very name love clearly points to the presence of this supreme conative tendency. That which we love and cherish becomes an object of active pursuit and active retention, and the several contributory emotional dispositions in the sentiment may easily be viewed as conative forces sustaining or reinforcing the supreme end. Thus, the function of fear and of anger in such a system is to resist forces which threaten to weaken or destroy that which we prize and cling to.

Development of a Sentiment. A sentiment, like an emotion, has its course of development. In some cases we may easily detect an instinctive origin. Thus a mother's tender fostering love for her offspring springs up at once when the situation of maternity arises, and shows all the characteristics of a powerful instinctive disposition. Here, again, we have to assume the preformation in the

mother's nervous system of certain congenital arrangements corresponding to the peculiar structure of the sentiment with its several tendencies, such as fondling tenderness, protectiveness and anxiety. A similar congenital basis for the structure probably exists in the case of other sentiments, such as self-regard.

After a sentiment has begun to organise itself we may recognise a lower and a higher stage of organisation. One's early love for a mother is a sentiment with a comparatively simple structure; whereas the later affection, after fuller experience and reflection have revealed more of her worth, is a much more complex system. This advance illustrates the growing complexity, ideality, etc., which we have seen to be involved in the development of an emotion. Thus the complexity of love is increased when an admiration for newly discovered qualities arises. There is a sense in which, as a result of this growing appreciation of qualities, we may love our parents more after we have lost them. A like growing complication and appreciation of qualities appears in the deep-rooted hates which abide with us.

Love and hate seem to be the two great types of sentiment.[1] These are not, strictly speaking, mutually exclusive, since we can at once cordially like one side of a man and as cordially dislike another. Yet such mixed attitudes ought not perhaps to be called sentiments. Development often substitutes a mixed for a simple sentiment, *e.g.*, when weak points betray themselves in a hero, or a nation which was at first dismissed as "beastly foreigners" comes to be better known and appreciated.

Different Levels of Sentiment. Our sentiments are numerous; we have specific likings or dislikes—for persons, classes of persons, nations, scenery, buildings; for active interests such as sports and studies, and a host of other things. Sentiment does not necessarily vary with the object. A girl's self-love with its caressing care of the

[1] On the question whether Respect should be regarded as a third type, see McDougall, *Social Psychology*, p. 161.

person has much of the character of tender love for another. On the other hand, sentiments which bear the same name, *e.g.*, "patriotism," may differ widely in their psychological composition.

This is not the place to attempt the difficult task of classifying the sentiments. As in the case of the emotions, it will be sufficient to distinguish between different levels of feeling. Our likes and dislikes are either (1) Concrete, attaching themselves to concrete objects, which may be (*a*) single, *e.g.*, a teacher, or (*b*) collective, *e.g.*, a whole school; or (2) Abstract, attaching themselves to ideas of qualities which give value to things, *e.g.*, beauty or goodness. Since the pleasurable concrete sentiments, so far as they refer to personal objects, are commonly spoken of as affections, we may without doing much violence to language speak of the whole group as concrete affections.

In the present chapter we will consider two or three varieties of concrete sentiment as well as of the emotions which enter into them. These have been selected partly for their intrinsic interestingness, partly for their importance in connection with education.

Educational Importance of the Sentiments. We may at this stage say a word or two on the value and educational importance of the sentiments. It is evident that, since they appear only at the ideational level as higher developments of the life of feeling, and constitute distinctively *human* growths, they have a high value. They form, indeed, a chief factor in the higher kind of happiness and personal value of the individual. As an organised system, a sentiment is valuable as introducing a restraining or inhibitory influence on the early animal-like emotional outbursts. The more violent emotions, such as anger and fear, become modified when taken up into one of these systems. Instead of being violent, capricious and unmanageable, they are now brought under restraint, being subordinated to the sentiment as a whole. We may see this by comparing the changeful behaviour of a child towards his nurse, in which fits of gushing tenderness

alternate with furious explosions of anger, with his more persistent and consistent attitude towards her later on when a sentiment of dutiful affection begins to become fixed. A similar reduction of a blind, violent passion to a calmer and more orderly form is seen in the transformation of anger when it becomes organised into the system of an intelligent self-love, and rudimentary reflection helps the child, when disposed to resent an injury, to estimate the amount of real injury done him in relation to some vaguely thought standard of his good *as a whole*, as well as to recognise more clearly the permanent attitude of the supposed offender to himself. Again, the growth of a sentiment involves an enlargement of feeling and an unification of it, similar to what happens in the growth of "interests" (see p. 134), with which, indeed, the sentiments are closely connected. A love for one's parent or country means a persistent affective attitude which embraces a large range of interested intellectual activity, of emotional reaction, and, on its conative side, of effort to attain, and to retain, its object. As a consequence of this, it constitutes an important step in the development of the later and more highly organised volitional processes.

The work of the educator in relation to the sentiments will then, speaking generally, fall to the positive side of culture. Hardly anything indeed lying within his powers can be better worth doing than helping in the formation of a stable sentiment of a healthy human type. The means available for the positive culture of feeling touched on in the preceding chapter can all be best employed in this development of the sentiments. The important influence of personality can nowhere be exerted more beneficially than in developing in a boy a worthy sentiment, *e.g.*, of patriotism, of admiration for noble conduct, by a clear and consistent exhibition of the feeling in oneself. In order to develop a sentiment we should, as far as we can, see that all the experiences and feelings which underlie it are realised. The pleasurable experience of joy in possession should, so far as this lies in our power, be sup-

plied: hence we must not, for example, be niggardly in granting occasions for an indulgence in a sentiment of affection towards ourselves. Weak over-indulgence, on the other hand, is to be avoided, since it is well that a child should constantly realise that the acceptance of our affection depends on certain pretty obvious conditions. The method of treatment here will, of course, be varied to suit the extreme cases of over-confidence and a gloomy hopeless distrust. Once more, we do well to insist on sincerity of sentiment, and to discourage anything in the shape of affected feeling. Again we need, while giving its proper value to feeling and correcting the prejudice not uncommon among boys that all expression of affection is unmanly, to aim at establishing a proper balance between the emotional intellectual and conative tendencies which, as we have seen, together constitute a complete sentiment. Lastly, we should aim in our culture of the sentiments to carry on our boys and girls to the more refined and intelligent stages of progress: to help them, for example, to discern the qualities in literature which give to it its dignity and its æsthetic value, and the qualities in human beings which make them worthy of affection and esteem. This last rule applies with special force to sentiments of antipathy and hatred, which, so far from being wholly bad, are, when properly enlightened and refined, susceptible of growing into valuable elements of a strong and manly character.

Self-feeling.

Structure and Forms of Self-feeling. We feel very differently about ourselves at different times, being now elated and proud, now dejected and humiliated. Yet in spite of such variations there remains a permanent attitude towards the self. This has been variously called self-feeling, self-regard, self-love. As in the case of the other likings, the primary experience on which the sentiment rests is the joy or elation which we feel in moments of

self-complacency when, for example, we think well of something which we have just said or done. Though based on joy, the self-feeling involves some exceedingly unpleasant emotional experiences, among which we may name the misery of a sense of failure, and of being humiliated or laughed at.

Self-feeling and Self-realisation: Love of Activity and Power. The self displays itself under different aspects, *e.g.*, as being strong or intelligent, and self-love has its corresponding sides or phases. Of these, the most important are the feelings which we popularly describe as the love of activity, of independence, and of power. These are closely related, all alike fixing themselves upon the *active* self, the self which strives to realise its powers. Since such active self-realisation is the condition of all the keener enjoyments in the self-feeling, it tends to bulk large and to become prominent in the sentiment. The love of liberty—which is so strong in a child and often makes obedience to parent and teacher so difficult—is essentially a feeling for the value of a full scope for activity. We only realise ourselves, our special ideas, tastes and aims, so far as we are free. The love of independence, in its simplest forms, is merely another name for this prizing of freedom as a vital condition of self-realisation. The love of activity, again—so far as it involves self-consciousness and is love of *my* activity—clearly directs itself to the self as active. Finally, the love of power, in its primary form, is the love of activity in its exceptional manifestations, involving particularly clear and impressive displays of our active power.

Like other sentiments and aspects of a sentiment, the love of activity is rooted in certain experiences of pleasure. These are secured in the case of the child, as in that of the animal, by the system of strong motor impulses with which he is endowed, the satisfaction of which brings keen enjoyment. There is a feeling of pleasurable elation in a full outburst of motor energy. The feeling of power grows more specialised when obstacles to muscular activity occur and are overcome. The grunt of satisfaction which an-

nounces the success of a small child in pushing aside or lifting a heavy object is an expression of this emotion.

The delight in realised power grows intellectualised and refined as a child's mind unfolds and he is able to reflect on a permanent self which grows in power, for example, to reach things, to lift them, and so forth. The feeling becomes still more refined by the gradual inclusion of intellectual and moral, as well as bodily achievements. The sense of enlarged ability to understand, and to decide about, things for oneself brings new pleasurable satisfactions of the feeling.

Development of Self-feeling. This transformation of the self-feeling with development is largely due to changes in the self-consciousness, resulting from the growth of new ideas about human values, a critical comparison of the several "selves" (see above, p. 315), and a more or less systematic construction of an ideal type of self as intelligent, capable or good. The change in the feeling may be described as a gradual development of that more reasonable kind of pride which we call self-respect.

Since the conception of self is highly complex, involving many variable qualities, we shall expect to find the corresponding feeling having a large degree of complexity. This complexity is increased through our tendency to attach to the "self" all that is intimately associated with it, *e.g.*, one's clothes, property, family, friends. Though the law has to distinguish between injuries to persons and to property, the feeling which the two excite is largely the same: the *nouveau riche*, proud of his fine country estate, will resent a trespass very much as he would resent a personal insult.

The self-feeling has a large value as a deep-laid element of personality. Although it has its exaggerated, unwholesome and ridiculous forms, it is something which the enlightened teacher will seek to preserve and to strengthen. The consideration of the problems arising in this connection will more conveniently be glanced at later on when we deal with its relation to the approvals and disapprovals of others.

Self-feeling as Modified by Social Relations: (*a*) Antagonisms. Thus far we have considered the sentiment of self, as much as possible, apart from social relations. Yet the fact that self-consciousness grows up in close connection with the intuition of other selves (see above, p. 311) suggests that the self-feeling is likely to be profoundly affected by the interaction between the individual and his social environment.

The most obvious effect, perhaps, of the social *milieu* on self-feeling is to introduce in some form or other antagonisms, together with their emotions of anger, resentment, triumph, etc. As instinctive emotions involving no self-consciousness they cannot be said to have a place in the system: but as soon as they assume the form of a retaliation involving the consciousness of an injured self, they have their place within the system. In this case the anger implies a painful or "wounded" self-feeling, and in addition to this, more or less clearly, an unpleasant depression of the sense of power, that is to say, a feeling of weakness and humiliation: for to be injured is, for the moment, to be in another's power and so weak. On the other hand, the pleasure growing out of retaliation means that the humiliation is over, that we are restored to our proper level. A persistent attitude of implacable hostility, too, includes, if only in a subconscious form, an intensified self-feeling, since there lurks in all hatred some memory of self-abasement and some hope of a recuperative uplifting. In the case of antipathies in which the active element is wanting the presence of the emotion of disgust, now complicated with dread of moral infection for the self, indicates that the self is still conscious and active—thrusting away what is foreign, offensive and likely to impair its efficiency in some way.[1] We thus see that the sentimental systems here called antagonisms not only overlap with the self-system but are in an important sense ancillary or reinforcing attitudes.

[1] See an excellent article "L'Antipathie: étude psychologique," by Th. Ribot in *La Revue Philosophique*, November, 1908.

Brutal Enjoyment of Power: "Schadenfreude". In speaking of the emotional effect of a personal injury we have touched on the feeling of power, in the narrower sense, as gratified in the situation of a conscious superiority to another, and pained in that of inferiority. The most impressive manifestation of this intensified feeling is to be found in connection with the relations of the master to the slave. Boys of the robuster build, physical and moral, are apt to display a well-nourished germ of this fondness for lording it over weaklings. And in much of this love of dominion there seems to be a delight in crushing the inferior, in inflicting humiliation, if not also bodily torture. This fondness for bullying is one chief source of children's cruelty. Quite puny children appear to take a positive pleasure in inflicting pain or in observing its infliction on human beings and animals.[1]

Closely related to this more brutal enjoyment of power is the more respectable-looking feeling, the self-complacency of the consciously superior person. This feeling, as *Punch* has told us, plays a large part in the "amenities" of fashionable conversation. Yet it remains an essentially "anti-social" feeling. To crow over another is to enjoy his humiliation, to indulge in *Schadenfreude*. Happily, however, as we shall see, the feeling is apt to be toned down and modified, as when a good-natured contempt, or better still, a feeling of amusement, humanises the attitude of the superior grown-up towards children's blunders.

The Attitude and Sentiment of Rivalry: General Characteristics. One situation which develops a particular variety of the antagonistic sentiment, having something of its combative heat and of its joy of conscious superiority (and misery of conscious inferiority), is that of rivalry. At first it may sound strange to speak of a "sentiment" of rivalry: the situation seems to involve conative effort much more than feeling. Nevertheless, when the attitude is fully developed it has its proper shade of sentiment:

[1] On the nature of children's cruelty, see *Studies of Childhood*, pp. 239 ff.

we do not feel in quite the same way towards a rival as we feel towards other antagonists, an enemy, for example, or an unpleasantly overbearing person. There is no new emotional ingredient: yet the mixture of ingredients yields a slightly different sentimental flavour.

In its simplest form, the feeling referred to is the enjoyment of the exciting consciousness of power in measuring it against that of another, as when a boy vies with another boy in some bit of manual dexterity. The situation clearly involves an impressive form of self-assertion with quickened feelings of ambition and pride: the conative energies are roused to an exceptional pitch of activity through the excitement of the contest. In this way the competitor attains a particularly vivid consciousness and enjoyment of power. Such a contest, moreover, opens up possibilities of the pleasures of proven superiority and victory, and, of course, of the corresponding pains for the other party.

Although it is to be distinguished from the passionate and more animal attitude of the fighter, the sentiment of rivalry shares in some of the characteristics of the latter. Since two rivals are each striving after something which only one can secure, whether the exhibition of superior dexterity or a place in the prize list, the conflict of interest tends directly to develop a feeling of hostility. If really eager for the prize the aspirant cannot help looking on a formidable competitor as an obstacle to fruition. Hence in a case in which the feeling is intense and pure—as in male competitions for the fair prize in which there can be no sharing—the rival fears lest his competitor should win, is glad when he is weakened, and envies him when successful. In other words, we find that the sentiment of rivalry is a peculiar modification of the attitude of antagonism, and of the self-feeling. In competing with another we are keenly self-conscious, we are wholly occupied in maintaining the self and its interests in the face of rival claims, and we feel towards our rival as towards an antagonist.

Modifications of the Sentiment of Rivalry. We are

speaking of a fully developed and persistent situation. Needless to remark that a good deal of competition falls short of this. The early playful forms of emulation in which boys challenge one another to feats invented for the purpose, such as turning back the thumb, are too slight and fugitive to heat the blood, though now and again a harsh laugh on the one side or the expression of a feeling of annoyance on the other tells us how near even in this case lie the pleasures and pains of the hostile attitude. The more important influences which tend to restrain and keep cool both boys and men in such contests are social ones, such as the control of the contest by well-understood "rules of the game," the admiration felt for those who prove themselves fair and generous in such contests, etc. When, moreover, a boy has a kindly nature the experience of a long contest may probably show him amiable points in his competitor and so develop the germ of true liking. This is the more probable as the very situation of rivals shows that the two concerned have at least one point of sympathy, namely, the interest which prompts each to compete in a particular line of activity, say proficiency in Latin. "Friendly rivalry" appears to mean this tempering of the heat of contest by a spirit of fairness. The coexistence in the same breast of a warm personal attachment and the full keenness of strife is, it is to be feared, beyond the reach of most of us.

Value and Educational Treatment of Antagonisms. The emotions and sentiments involved in the forms of antagonism just touched on have had various values attached to them. A member of the Society of Friends, for example, will take a different view of them from that taken by a pugnacious patriot. In education they have sometimes been treated in lump as "anti-social tendencies" which moral training has to reduce to puny rudiments, if not wholly to destroy. That early training has to restrain and control a boy's animal-like anger and combativeness is a sufficiently obvious truth. A less obvious one is that it has to recognise the value of these tendencies, their

proper function in the life, not only of the individual, but of the community, and, where they are deficient, to encourage their manifestation and even to foster their growth. It is not well, for example, that the boy who suffers from the more cruel kind of "teasing"—not to speak of hectoring and bullying—should bear it all in a tame weak-spirited manner. The impulses of combat and of retaliation are rooted in the deeply fixed instinct of self-preservation, and they have their necessary function as subserving this instinct. Nor would such tame submission be for the benefit of the school or other community concerned. The bully, with his huge appetite for the enjoyment of mastery, is the anti-social type of person which a civilised community is bound either to transform or to eject. Nor is this all. The feelings we have been glancing at are, as we shall see, feeders for higher sentiments which all men praise. Our moral sentiment, for example, would be a flabby and anæmic thing without its half-veiled elements of anger and retaliation when confronted with wrong-doing.

Not only so, the wise educator will discern the value of the more lasting dislikes which grow up among the young. He will, of course, have to watch these carefully and seek to restrain them when they take a wrong direction or assume an unlovely form. At the same time he should bear in mind that they promote individual development and may further the growth of some of the most valuable traits of character. Perhaps no part of education is really more important than that of studying a boy's antipathies, his "pet aversions," for this and that sort of person, respecting and even encouraging these where they are legitimate expressions of the impulse of the individual to protect himself against contamination.

With respect to the sentiment of rivalry, too, there is room for different estimates of value both by the moralist and by the educator. "Emulation," says W. James—agreeing with the Jesuits—"is the very nerve of human society."[1] Teachers in general—pretty certainly English

[1] *Talks*, p. 49.

teachers, who are apt to be dominated by their highly organised system of competitive examinations—are wont to set great store by it, making an appeal to the spirit of emulation a chief stimulus to exertion. Nobody doubts that most boys, and most girls too, need the stimulus of example, especially that of others a little higher up in the scale of attainment than themselves, in order that ambition may be fully awakened. Not only so, the situation of competitor for a prize with one or more rivals may supply a valuable exercise of the young will in the strenuous and sustained pursuit of an end. Yet the teacher should never forget that the stronger appeals to this impulse mean calling in the aid of exciting pleasures rather than of that quiet cheerfulness which is better (see above, p. 387). A large ill-considered use of this stimulus is indeed apt to partake of the characteristics of an artificial forcing of growth. Not only so, by setting boys one against the other in exciting contest, a teacher may incur the risk of developing more of the spirit of antagonism than is desirable. This risk was pounced upon by Rousseau and Cowper in their attacks on the emulatory side of the school, the latter going so far as to say in his poem "Tirocinium" that the emulation of our public schools is a compound of "envy, hatred, jealousy and pride". Such language, exaggerated as it is, touches on a real moral weakness in the much-competing type of school. The American school is said to make much less use of prizes than the English, and this suggests that where there is a keenness of mind about knowledge and culture the need of the incentive of rivalry diminishes.[1] In any case the stimulus of competition should not be required in college training; though even at this stage perhaps, as things are at present, it would sound like a counsel of perfection to bid the university teacher count on the sort of intellectual labour extolled by Matthew Arnold.—

[1] Miss S. A. Burstall has recently brought out this feature in her *Impressions of American Education* (1908).

Too great for haste, too high for rivalry.[1]

(*b*) **Reflection of Others' Attitudes towards the Self: Early Forms.** The influence of the situation of antagonism just spoken of in sharpening and strengthening the sentiment of self is a limited one. Social relations involve friendly attitudes, such as a pleasurable interest in another's doings, or a regard for his opinion; and these attitudes supply influences which profoundly modify the developments of the self-feeling. This action of the social environment on the developing individual connects itself in a peculiarly close manner with the educative influence of the personality of the teacher.

That man is a social animal may be seen by a close observation of any normal child. Postponing the consideration of the germs of such social tendencies as tenderness and sympathy, we may note the child's high degree of impressibility to the behaviour of others towards himself. He is keenly alive to their notice. He may, in general, be said to like notice, and will go through curious contortions of effort when he thinks he is not getting enough of it. The liking may be detected even in his bashfulness when confronted with a stranger. This unpleasant form of the self-feeling, which in general does not appear before the third year, must be distinguished from the timidity which a child is apt to show at an earlier stage. It witnesses to the germ of an emotional sensitiveness to the notice of others and to their whole mental attitude towards him. It involves an unpleasant sense of insecurity in which we can discern a faint element of fear —of which even older persons may sometimes detect traces in themselves—fear of the scrutiny of the suddenly levelled strange eye. This interest in the attitude of others towards him is seen in his close and shrewd observation of the expressions of their disposition towards him. He will take much pains to impress others, to win their admiring regard. He will show them work that he has done or

[1] *Sonnets*, I., "Quiet Work".

things that belong to him so as to raise his importance in their eyes. One may sum up these early tendencies by saying that a child has the impulse to make himself impressive and attractive when confronted with others, so as to produce a favourable impression on them.

Love of Personal Recognition and Approbation. Out of this earlier general tendency to impress and attract others there gradually emerges the disposition to look for and enjoy a higher sort of personal recognition. The appearance of this feeling marks the attainment of a later stage of self-consciousness, of the apprehension of self as a person with feelings, thoughts and strivings which have an inherent value to be determined and judged of by others. This higher form of regard for the "social self" is commonly spoken of as the love of others' good opinion or approbation, and in its more intense form the love of praise. Unlike the earlier love of producing an agreeable impression, this specialised form of self-feeling tends to confine itself within a narrower range, directing itself preferentially to those for whom the child has a liking and for whose good opinion he specially cares, *e.g.*, the boy specially good at games, or the schoolmaster.

A word or two may suffice to illustrate the relation of this feeling for others' appreciation and approval to the self-feeling as described above. It is evident that we have here to do with a sentiment which acts as a powerful support of the more private and direct regard for the self. As has been pointed out above (see p. 312) the growth of self-consciousness, and the kind of idea which a child forms about itself, are largely determined by the estimates of others. In the early stages of his intellectual development he is too weak to think out a clear consistent view of the self: nor can he with his limited experience know enough about himself to be sure what sort of a person he is or is capable of becoming. Hence his craving for others' recognition—an impulse which he betrays even when he would appear indifferent to it. There is a certain utility, at this early stage of development, in the disposition to lean

on others' expressions of feeling and approving words, to assimilate their estimates and to make his idea of self largely a reflection of their attitudes towards him. As Locke has it, "reputation" is the proper guide and encouragement of children till they grow able to judge for themselves.

This buttressing of the self-feeling by a regard for others' opinions and sentiments continues in the later stages of development. It belongs, indeed, to our social nature and condition. In the growth of the man's more independent feeling about self the influence of others' attitudes, though greatly diminished, never disappears. The great difference is that the man has by reflection and criticism constructed a select social world, for whose good opinion he now chiefly cares, and with which he tends to identify himself more and more closely.

The self is, however, more than a "social self"; it has its sacred privacies which it cannot or will not disclose to others. This applies especially to the affective side of self-consciousness, since, as we have seen (p. 359), feeling as a whole is the phase of our mental life the least accessible to another's ken. The gratification of a true self-feeling differs in kind from the enjoyment of others' favourable regard which supports it; and, while it is true that an intelligent friend may now and again see more clearly into our minds and characters than we ourselves can see, all who have developed a full individuality take up into their sentiment of self-regard a feeling for aspects of it which are hidden from the most intimate of outside observers.

In this short account of the sentiment of self little reference has been made to its disagreeable side. On this point it must suffice to say that shame, wounded pride, the feeling of being misunderstood and misappreciated are among the bitterest experiences of early, as well as of later, life.

Value and Educational Treatment of the Self-feeling. There appears to be a popular prejudice against the self-feeling as a whole, with which the teacher is apt to be

affected—though perhaps less than others. He knows, if he wisely reflects, that this sentiment, so far from being an obstacle in his path, is his most valuable ally; that full "self-activity" is only realised when a child has a happy consciousness of his energising self; and that moral growth, no less than intellectual, implies a healthy development of the self-feeling. No doubt, the sentiment has its better and its worse forms, and is particularly apt to grow exaggerated and to become morbidly misshapen. Yet this should never blind us to the immense educational importance of its normal growth.

The first rule in the educational management of this feeling is to give it due respect, and to avoid that kind, and that frequency, of repression which will tend to discourage and to weaken it. Even when administering rebuke and punishment, the educator must always stop short of wounding the self-feeling as a whole. That is to say, while seeking to develop a sense of shame he will aim at retaining the child's higher self on his side, so as to keep alive self-trust with its cheerful forward look to something better.

The next important point is that the educator needs to discriminate the less worthy from the more worthy forms and directions of this feeling. While he will not unreasonably expect the higher forms at too early a date, he will in the earlier stages begin to act restrainingly on such growths as the weaker kinds of vanity, a greedy love of admiration and popularity, an excessive fondness for external recognition merely as such, and a disproportionate estimation of "showy" qualities which are likely to impress others, such as good looks and physical strength. Not less solicitously should the educator's restraining hand seek, so far as possible, to keep in touch with distinctly morbid aberrations of the feeling, *e.g.*, the impulse to hide itself from others, or to indulge in the more silly and inflated kinds of vanity.

As in the case of the irascible disposition, the love of combat, and the other emotional tendencies which support the sentiment, we have to beware of the educational error

of seeking to extirpate the self-feeling as something radically bad, and to aim rather at developing it in such a way as to substitute a higher and more dignified form for the first crude and less worthy one. This can only be effectually done by so developing the whole mind and character of a child that he becomes capable of recognising the real, "objective" values in human qualities. A beginning, however, may be made in early life by helping him to discriminate the well-considered judicious praise of one sort of person from the facile and foolish flattery of another sort. Throughout this effort to illumine a child's self-feeling by clearer ideas of what has personal value, a teacher should set the standard of the really valuable sort of opinion by taking care in his own recognitions and commendations to lay stress on moral value, *e.g.*, by commending worthy effort even when it falls short of success.

Throughout this action on the self-feeling the teacher will keep before him the aim of all education, namely, to develop self-reliance. In this particular case the object will be to develop a reasonable attitude of *pride*, in the higher sense of the term, or, as it may perhaps be better named, *self-respect* (Note A).

There are many opportunities, *e.g.*, in lessons on history and literature, for exercising boys in clearing up their ideas about elements of personal value. The social life of the school will now and again offer occasion for a few pointed corrective remarks on human values and their proportions; and private talks with a boy may supply a much-needed encouragement in his effort to form his own standard-conception of self, and to live up to it firmly and courageously.

Social Sentiments: Affections. We may now pass to those social attachments which are what the word "Love" first suggests to us. The love of others' good opinion, though it may assume the form of an omnivorous greed for praise, tends, as already observed, to become a constituent of some personal affection: the child cares for the favourable opinion of some one whom he loves.

General Structure of an Affection. Our human attach-

ments vary greatly in their characteristics: compare a boy's love for his mother, for his "chum," for his favourite teacher. Yet they have certain common features, and a common type of structure. In each of the cases just instanced the boy finds a pleasure in the society of the beloved person, also in recalling or anticipating such society; further, he is tenacious in holding on to his possession, fears a threatened loss, regrets having foolishly weakened the tie, and so forth. In addition to these characteristics, common to all firmly rooted likings, whether for persons or other objects, there are special ones which differentiate human love from other likings. Without attempting an exhaustive examination of these constituents, we may note some of the more important.

To begin with, there are differentiating physical attractions, the soft warmth of the body, so potent an attraction for the infant and valued even by the adult, as the English hand-shake and the warmer continental embrace attest. The charms of the human eye, graceful movement and gesture, and a rich, finely modulated voice constitute a powerful group of attractions. Yet by no psychological alchemy can one conjure human love out of the effects of any such sensuous gratifications. The sentiment, in its healthy forms at least, fastens on what is distinctively human, the expression of something in the "inner man" which is winning and admirable. These human excitants of love include all manifestations of pleasure, cheerfulness, and especially a disposition to diffuse happiness. The disposition to radiate happiness on others grows more attractive and love-provoking when it is seen to crystallise into a friendly attitude towards ourselves. A child, face to face with a stranger, passes from the attitude of timidity or bashfulness to the friend-making attitude as soon as signals appear of a kindly disposition. In the growth of a lasting love this influence of friendly approval and of kindness is vastly extended by feelings of gratitude which—*pace* the cynical proverb—is based, not on calculating anticipations, but on memories.

With these winsome manifestations of amiability there always goes some amount of admiration of human quality and capacity. The simpler kind of æsthetic feeling for bright eyes, a musical voice, etc., begins at an early date to be reinforced by some appreciation of such endowments as brightness in talk and cleverness.

In order to complete this enumeration of the chief constituents in love we must add sympathy. This means, in the sentiment of love, the impulse to get near the beloved person in thought and feeling, to understand and be understood by him, to share his ideas, feelings, etc. As will be seen presently, this personal sympathy, though it may vary greatly in the degree of its intimacy and assimilative influence, is of the very soul of what we call human love. All our language about the sentiment, as when we speak of being drawn one to another and of becoming united, points to the high place it occupies in our affections, helping at once to mould their form and to supply the intimacy and warmth of love.

Enough has been said, perhaps, to help us to see that love, in this human sense, is a unique emotional system. This may be seen by a glance at its expression, the tender caress, from a holding of the hand or touching of the shoulder up to the full embrace. The symbolism of this expression seems to be, not merely a wish to retain what is dear, and to draw it closer, but to envelop it as with sheltering wing. This expression is seen most clearly in the oldest of human loves, that of the mother for her infant. The whole bodily attitude in this case has indeed so powerful an effect on the quality of the joy expressed that we name the whole feeling "tenderness".[1] It may be added that the uniqueness of this sentiment is shown in the modifications which some of its constituents undergo when taken up into the system. Jealousy, which

[1] On the nature of tenderness, and its relation to love, especially to parental love, see Herbert Spencer, *Principles of Psychology*, ii., pp. 622 ff.; A. F. Shand, in Stout's *Groundwork*, pp. 213 ff., and McDougall, *Social Psychology*, pp. 66 ff.

is probably only a special modification of the self-feeling combined with its ally, the impulse to resent any attack on what is cherished, takes on a new shape when enlisted in the service of love.[1]

The general course of the evolution of a human affection has been hinted at in specifying its characteristics. It is important to note that the system of emotional and conative tendencies involved has an instinctive basis. This, as we have seen, is clearly shown in maternal love. For the rest, affection grows deeper, richer, and more refined as its constituents expand and become more finely differentiated through the growth of ideation and of a nicer insight into what is worthy of love in the object.

Sympathy. One ingredient in a warm affection is so important in its bearing on the whole of emotional development, as well as on education, that it needs a few words of further elucidation in this place. This is sympathy, which means feeling with another (*Mitgefühl*). It may be roughly defined—from the psychological point of view, *i.e.*, that of individual experience—as the tendency to share in the expressed feelings of another, and to invite his expression of fellow-feeling, so as to secure an agreeable consciousness of unity of feeling.

Sympathy is not the name of a perfectly new variety of emotion: to sympathise is to appropriate imaginatively another's emotional state; and it directs itself alike to such dissimilar feelings as fear and æsthetic enthusiasm. It is thus a great supporter and enlarger of the individual's emotional experience as a whole. The consciousness of another's sympathy adds to our joys whilst it tends to assuage our sorrows. Our capacity of entering into others' emotional experiences helps to determine and to measure the range of our affective consciousness. The culture supplied by humanistic studies, such as history and literature, is largely due to the circumstance that they exercise the student in entering sympathetically into new human

[1] *Cf.* McDougall, *Social Psychology*, p. 138.

experiences, and so gaining a larger and clearer insight into human nature in its countless individual modifications.

In its earliest germinal manifestation in animal life, as seen in the tendency of sheep and gregarious animals generally to catch up and repeat sounds of fear, etc., sympathy implies both the giving and the receiving of a sympathetic sign. Similar conjoint experiences of sympathy occur in panics and other crowd outbursts, such as anger and "infectious" hilarity. It is illustrated, too, in the quieter sort of "sympathy of numbers," as when we enjoy with others music or an interesting lecture—a mode of fellow-feeling which is so valuable an aid in the class-room. In the more explicit form of "exchanges" of sympathy this reciprocal give and take occurs in the talk of friends about books, work, art, etc.

The circumstances of life, however, often require us to set apart the asking for sympathy and the showing of it. The asking for it is decidedly the easier for most adults as it is for all children. The reason has already been suggested. The reception of sympathy gratifies the self-feeling as a sign of another's kindly attitude. The sweetness of the right sort of person's approbation of our action implies the gratification of our craving for sympathetic support: it seems to chime in musically with our self-feeling.

The giving of sympathy, on the other hand, does not always bring pleasure in this direct way; whence it happens that children, and many adults too, while craving sympathy from others are loth to reciprocate it. The difficulty is not the same in the case of manifestations of pleasure and of pain. To sympathise with a friend in his new happiness is to taste something of that happiness; while to sympathise with him in his unhappiness is to share in this and, so far, to suffer. Hence it is said by Herbert Spencer that the sympathetic response to a strongly manifested pleasure is quicker and more universal than the response to a strongly manifested pain.[1] Yet opinions differ on the point, Jean

[1] *Principles of Psychology*, ii., p. 573.

Paul going so far as to say that, while sympathy with pain requires only that one be human, sympathy with pleasure needs that one be an angel. It is to be noted that sympathy with pain, though primarily painful, has its alleviating pleasure when suffused with a warm kindness. Herbert Spencer has a whole section on the luxury of pity.[1] Hence the tendency of lovers and others to drop into the language of tender pity at the suggestion of very trivial ills.[2]

The habit of exchanging sympathies acts as a potent assimilator of feelings, convictions and aims. Friendship —of the old-fashioned warm and intimate sort—owes much of its educative value to the habitual exchange of ideas and sentiments, by which unpleasant eccentricities get worn down, points of disagreement become enlightened and respected, and a valuable central core of common tastes, likes and dislikes established.

Intellectual and Conative Aspects of Sympathy. Sympathy is closely allied to the imaginative realisation of others' mental experiences already touched on (see p. 260). A boy, when understanding Wolsey's downfall, and when sympathetically entering into its misery, carries out a similar process of constructive adaptation of personal experiences. Yet there is a difference of mental attitude in the two cases. In trying to understand the situation and its effect on Wolsey the boy's conative process is directed especially to the development of clear explanatory ideas. When, however, he imaginatively shares in the cardinal's prostrating grief, this consciousness of striving towards an end is greatly reduced: he takes on a comparatively passive attitude, in which the sympathy itself supplies all the impulse needed for its own developing and completing. These two attitudes may combine in very unequal proportions, as in a mother's sympathy, in the actor's realisation of a character, and in the divining of a boy's feelings

[1] *Op. cit.*, ii., pp. 622 ff.

[2] Mr. A. F. Shand has given an excellent account of the relation between pity and sympathy in Stout's *Groundwork of Psychology*, pp. 199 ff. Compare *The Human Mind*, ii., pp. 112-14.

and motives by the schoolmaster. The contrast between them stands out in a garish light in that studied cruelty which understands the pain it inflicts, yet, so far from being unpleasantly affected by it, finds pleasure in it.

The conative side of sympathy becomes much more prominent in what is best called *active sympathy*, that is, a feeling which immediately prompts to an active furtherance of the joy, or an active alleviation of the sorrow, shared in.[1] The disposition to give this active sympathy constitutes what we call benevolence. It is not restricted by personal affection, but, as we see in the case of the great humanitarians, such as Elizabeth Fry and Wilberforce, may be directed to those who are quite unknown. As a practical attitude, moreover, it tends to restrict the richer emotional experience of fellow-feeling. The practical humanitarian, indeed, is apt to disparage not merely a sentimental indulgence in "idle tears," but even condolences and other verbal utterances of sympathy—perhaps unduly, since the soothing voice of a sympathetic consoler has its own practical value. Charlotte Brontë illustrates in *Villette* the divorce of benevolence from personal regard in her admirable study of Madame Beck, of whom she writes: "In philanthropic schemes for the benefit of society at large she took a cheerful part; no private sorrow touched her".

A complete development of the sympathies implies a certain equilibrium between the tendencies here distinguished, (*a*) intellectual sympathy or understanding, (*b*) emotional sympathy, and (*c*) active or practical sympathy. The due balancing of emotional and practical sympathy is illustrated in a general disposition of kindliness or friendliness, which is ready to embrace stranger and even foreigner. Nobody will question Dr. Johnson's sound English instincts; and yet it was he who inveighed against the way of two Englishmen, who happening to be both visitors in the same house, will, rather than speak to one

[1] The expression "active sympathy" seems to be more appropriate to this effective sympathy than to the desire for others' sympathy to which Dr. McDougall applies it (*Social Psychology*, pp. 168 ff.).

another, "probably go each to a different window and remain in obstinate silence".[1]

Modifications of Affection. Sympathy, in the form of a disposition to enter into and understand the person we love, to wish him well and to serve him, is common to all affections. Yet its form, as well as its intensity, varies greatly in different sorts of affection. Tom Brown's protective chivalrous sentiment for the school fledgeling Arthur had room for some of the tender sympathy of a mother's love, as well as for the sympathies of common tastes and interests which more frequently bind schoolboys together. Contrariwise, sympathy becomes greatly restricted in cases where the affection is modified by the presence of foreign elements, as where the object of the attachment is in power and has authority. The love of a boy for a good and highly respected father may be real and strong, yet it certainly does not illustrate all that we mean by the tenderness of love. The attitude towards authority, as such, having in it something of the shrinking of fear, something of the repressing effect on the self-feeling which much respect for superiority is apt to produce, and something too of the rebellious disposition of the "old Adam," greatly restrains the outgoings of tenderness. And this would suffice to check the impulse to ask for, and to offer sympathy. It is a matter of common observation that the young find it hard to open themselves up in confiding sympathy to those of whom they habitually stand in awe. Nevertheless, boys are the devoutest of hero-worshippers, and their affections for older boys often have this worship as a prominent element, *e.g.*, the love of Harry Richmond for Heriot in George Meredith's novel. When the person in authority can win their warm admiration, as some of the same writer's tutors succeed in doing, affection recaptures something of its warmth in a youthful enthusiasm. A master, who is a good bat or oar, or who has achieved a memorable climbing feat, has a chance of

[1] Boswell's *Life*, Everyman's Library, ii., pp. 448, 449.

surrounding himself with the fervour of boys' manly sort of love for which many a father would be thankful.

Educative Action on Affections and Sympathy. The educator has a large problem to face in dealing with the germs of social affection and sympathy. It has slowly come to be recognised that the school, as well as the home, should supply a training in sympathy, not only on its intellectual but on its more emotional and practical sides. The schoolmaster should seek to develop sympathy and the friendly attitudes in his individual pupils by acting on the boys *en masse*, *i.e.*, by trying to modify the spirit of the little community. This part of his problem will, it is to be hoped, be aided by the young science of social psychology alluded to above (p. 14). This indirect regulation of a boy's sentiment should be supplemented by a direct action on individual boys, by getting into some kind of warm personal relation with them.

In doing so he will need all his admirable characteristic patience. To begin with, since the situation of the person in authority is apt to chill off warm ebullitions of feeling, he must temper the effect of authority by showing personal qualities which will attract and endear. He will seek to call forth recognitions—if it is only in the form once vouchsafed by a boy to a famous headmaster, "a beast, but a just beast"—also admirations for as many admirable traits as possible, and personal gratitudes. Among these generators of the needed warmth of affection a good-natured humour—from which the sting of sarcasm has been carefully extracted—ought, perhaps, to rank high in value.

In the special problem of getting into sympathetic touch with his pupils the teacher should remember that his task is pre-eminently that of evoking sympathy in response to sympathy. Since we older folk have been young, whereas the young have never been old, it is only reasonable that we should make the first advances in sympathy. Little words and acts of kindness have often served the teacher as a golden key, not only to a boy's

affections, but to his sleepy mental energies, rousing him to a more spirited activity. The friendly sentiment thus evoked will give a new bent to the boy's thoughts and aims. He will now begin to taste the full delicious flavour of commendation in that of his revered leader; to feel the full magic of personality in that of his hero-friend; to find something better than rivalry with his mates in an admiring emulation of his captain; and to transmute the craving for sympathy into an ardent endeavour to become what his friend and guide would have him be.

In these sympathetic responses much will be effected, half-unconsciously, through the mere play of the imitative tendency to catch the manner, and, along with this, something of the spirit of the new hero-friend. The subtle influence of such a new worshipful affection will be seen, too, in the quick budding of new intellectual and other tastes on which the teacher has shed the genial influence of his personality.

If wise, however, the teacher will not let the adoration of heroes, however sweet to him, grow too luxuriant. He may even find it needful now and then to appear brutally cold towards expressions of young admiration in order to encourage another kind of boyish friendship, with more equal companions. Boys' friendships *inter se* have their own educative value, and among their other advantages, such as that of offering a much wider scope for the give and take of sympathy and kindly action, they have the advantage of being safe-guarded from the risks of insincerity inseparable from all idolatries.

With respect to the educational treatment of the several forms of sympathy spoken of above, little needs to be said. The infectious crowd-sympathies of the playground, though dear to a popular master, have their dangerous tendencies and need to be watched and directed. Absorbing boyish friendships, though possibly less common than they used to be, need even more the schoolmaster's discreetly half-hidden, controlling hand; for though, when wholesome, they supply one of the educator's most trusty auxiliaries, they

may degenerate into unwholesome forms. As regards the intellectual, emotional, and practical directions of sympathy, the teacher will try to realise the full function of each, firmly opposing gushing sentiment when it is out of place, yet recognising warmth and even vehemence of sympathy, as well as the fierce indignation which springs from it, not only as things human and therefore not alien to him, but as some of the most precious raw material offered him for the moulding of character.

As we have seen, school life is largely the rehearsal of stages of preparation for action not needed now, but, if at all, much later. The older writers on home-education rightly warned parents against allowing children to grow into the habit of indulging in sympathetic emotion, and especially in tearful pity, without following up the feeling by practical endeavours to aid others. The teacher of to-day needs the warning too. A readiness to find satisfaction in the mere shedding of the barren kind of theatrical tear is but too easily acquired by certain children, as by many theatre-going and novel-reading adults. Yet it would be hard on a teacher to insist that a child's pity should always translate itself immediately into helpful action. It is enough if he takes care to see that the sympathy called forth by a touching page in literature is genuine, not a bit of sentimental affectation; and if, concurrently, he uses all available openings for exercising his pupils in active helpfulness. Most important of all, perhaps, in this part of educational work is the training in that larger kind of sympathy which makes men generally disposed to be kind, considerate and sociable. This training means resolutely working against some of a boy's strongest prejudices, *e.g.*, those of nationality, and of social class. One of the finest things an English public schoolmaster could cultivate in boys to-day, in addition to the good manners towards people of one's own set—which might largely be left to outside influences—is a general attitude of affability and friendliness. This would include some practice in the old and beautiful courtesy towards strangers

which one may still meet with in Norwegian, Italian, and other peasants, and which would be a welcome substitute for the silly *gaucherie* or positive rudeness of manner which contact with strangers too often brings into view in boys. In another and more serious direction this truly humanising training might work against the prejudices of nationality, enlarging the boy's conception of what constitutes national greatness and patriotic service, and showing him how the love of the best things in our own country and race compels us to recognise kindred points of excellence in others.

NOTE.

NOTE A (p. 418).—The distinction between Vanity and Pride has often been discussed. Both are agreeable aspects of the self-feeling. Vanity is a less intelligent form of self-feeling: it finds its satisfaction in some possession which is external and showy, and so wins others' recognition. This applies to vanity with respect to personal appearance. Hence, as dependent on others' feelings, the instability of the feeling, and its liability to fail when the external prop is removed. This instability seems to be suggested in Milton's epithet "Wandering Vanity". Pride, on the other hand, is that more intelligent, independent and stable form of self-complacency which comes from the conscious possession of something of real worth, and in its higher forms connects itself with self-respect. It follows that as mental development advances there is a gradual transition from vanity to pride. (See article on "Eitelkeit" in Rein's *Encycl. Handbuch der Pädagogik.*)

CHAPTER XVII.

ABSTRACT SENTIMENTS.

In the present chapter we shall consider these higher organisations of feeling which have been marked off as abstract sentiments, such as the love of justice and of beauty. They are comprehensive sentiments which embrace a wide range of dissimilar objects, *e.g.*, the many things in nature and art to which we ascribe beauty. It is upon this common aspect or abstract quality that the appreciative sentiment in its more intelligent form fixes itself; for which reason we give it the name of "abstract sentiment". It may be added that these higher sentiments, by attaching themselves to what has value for all persons, so far as they are educated, are in a peculiar manner impersonal or disinterested. As such they appear as common sentiments of the community, in which education helps the individual to participate.

Transition to Abstract Sentiments. These abstract sentiments are led up to by others which form a kind of transition from the concrete to the abstract type, and may be called Collective Sentiments. A familiar example is patriotism, or love of country. This sentiment is highly complex, including emotional constituents of very unequal rank, such as a blind instinct-like attachment to our familiar home, language, modes of cooking, etc.; a love of the characteristic scenery of our land; an intelligent admiration of our national institutions, literature and so forth; and a feeling of piety for those who have served the country and added to its reputation. The sentiment varies from citizen to citizen in complexity and dignity no less

than man's love for woman varies. Although comparatively concrete, it approaches in its highest form to the abstract type. That is to say, for the man who reflects, love of country tends to attach itself to those distinguishing features of it, such as scenery, customs, and achievements, which have an intrinsic value. In this way the love of one's country, race and nation tends to approach a strictly abstract type, namely, love of humanity in the narrower sense of this expression.

The abstract character of these sentiments suggests that their full development belongs to manhood rather than to childhood; and it is true that in their more refined and enlightened form they are experienced, if at all, only after the education of the schoolmaster begins to be followed by self-culture. At the same time, germs of these feelings, *e.g.*, a liking for pretty things, appear in early life long before they grow explicitly abstract, and education is much concerned with their further development.

Characteristics of Abstract Sentiments. As their name suggests, these sentiments have the typical form of love—we delight in and cherish what is beautiful, good, etc. At the same time they necessarily imply an attitude of antagonism towards what is opposed to the cherished aspect. Thus, to love and seek what is beautiful or good is to hate and shun what is ugly or bad. Both the like and the dislike in this case are real and strong. We love beauty, goodness, truth with a certain warmth, cherishing and clinging to them. Similarly we hate ugliness and badness with cordial hatred. Yet the abstract and remote character of the object modifies the love, making it less intimate than our concrete loves.

As the most highly organised of the emotional systems these sentiments have great complexity. This is strikingly illustrated in the variety of their elements; feelings of different kinds, as well as perceptions and other intellectual processes being taken up into an intelligent love of beauty or of moral goodness.

Again, the abstract sentiments have their rudimentary

and implicit, as well as their fully developed and explicit stage. A boy's love of goodness, for example, first appears as an element in a love for a person, say the mother. The clear discernment of the goodness, and the love of it for itself, in whomsoever it may appear, gradually detach themselves from the early concrete affection.

As the term abstract suggests, these sentiments in their explicit form are highly intellectualised feelings. Much fine observation, discrimination, relating of part to part, as well as imagination and reflective thought, enter into an enlightened feeling for the beauty of a poem or for the moral excellence of a human action.

This intellectuality is evident in the close connection between the abstract sentiment and the *judgment of value*. All varieties of love imply some sense of value. Even the mother's fond love involves a vague appreciation of value for herself. But in the case of the love of truth or goodness the value is objective, recognised by all competent persons. Even in this case, however, feeling is the source of the value. Thus we appreciate the beauty of a picture only as a result of our own and other persons' enjoyment of it; though we often enjoy the contemplation of beautiful things before we reach a clear appreciation of their value.[1] This close connection between feeling and judgment is reflected in the structure of these sentiments. We have in this case a standard-conception of value, *e.g.*, of what has intrinsic moral excellence, and, subordinate to this, concrete varieties of moral excellence. In this way the abstract sentiments assume on their intellectual side something of the form of a classification (compare above, p. 325).

While the intellectual aspect is prominent in these sentiments the conative aspect is also important. All love has its impelling force, and the love of truth and of moral goodness implies a distinct conative attitude, the desire and resolve to seek and preserve what we prize.

[1] Compare what was said above (p. 393) on the relation of ideas to feelings.

We shall now examine the three sentiments which are most comprehensive in their range of object and have the highest degree of abstractness of character, namely, the love of Knowledge or Truth, the love of Beauty, and the love of Goodness. They are often spoken of as the intellectual, the æsthetic, and the moral or ethical sentiment.

(*a*) The Intellectual Sentiment.

The intellectual sentiment covers what we call the love of Knowledge and the love of Truth. The first has more of the character of a collective sentiment: we delight in knowledge as a large organised whole, seeking to enlarge it. The love of Truth is rather more abstract, being a regard for that aspect of all knowledge which we call its truth. We may accordingly consider each of these aspects of the intellectual sentiment to some extent separately.

The Love of Knowledge Defined. The love of knowledge is a complex sentiment involving many elements and presupposing a variety of experiences. Since love is a sentiment based on an experience of joy, flowing from the presence and the contemplation of the object, we can never love knowledge till we have tasted the delight of reaching and possessing it. Yet in the genesis of the sentiment feelings of the opposite quality, such as a painful sense of ignorance and perplexity in the face of baffling difficulties, play a part. Happily, children are incapable of realising the whole extent of their ignorance. Many of them, however, are apt to be oppressed by glimmerings of the proportion of the puny area of their knowledge to the vast realm of the unknown. This unpleasant consciousness of ignorance indirectly contributes to the joy of attaining knowledge by spurring the mind to the needed effort.

Closely connected with this sense of ignorance is that of the impotence arising from want of knowledge. Urged

by his practical impulses, a child is apt to be pulled up by such questions: "How can I do this?" "Where can I find that?" Much of the appreciation of knowledge, by children and adults alike, is thinly disguised appreciation of practical value: though they may not philosophise, they are largely "Pragmatists," in the sense that they regard truth as that which helps one to live. Yet the child is not wholly a Pragmatist. As we shall see presently, he shows his superiority to the out-and-out practical animal in the possession of a germ of a love of knowledge for its own sake.

Wonder and Curiosity. By curiosity in the present connection, that is to say, disinterested or intellectual curiosity, we mean the conative attitude of desiring and seeking knowledge. This implies some feeling for the value of knowledge, though the appreciation may at first be of the vaguest and implicit only.

This conative attitude grows immediately out of interest, being indeed implicated in the whole mental state which we commonly call "being interested" in something. The conditions of this intellectual activity have already been touched on. For its appearance, even in a simple form, some new sense-presentation or idea, partly familiar and partly unfamiliar, is necessary (see p. 136). The most favourable condition for the rise of genuine curiosity is the appearance of something strange and unsusceptible of assimilation in a familiar object, as when a dragon-fly—which has often delighted a boy as a flash of brilliant tinsel—is first seen poising itself in mid-air with no clearly perceptible wings to support it.

Wonder is an emotion in which the affective quality of excitement is predominant. Whether it is ever a perfectly neutral feeling with regard to pleasantness and unpleasantness, as Prof. Bain contends, may be doubted. What is certain is that children and adults find their enjoyment in wondering, being indeed greedy of what we call the delights of the marvellous. Wonder is thus a powerful stimulus to mental activity, rousing attention to an exceptional pitch of energy.

We have seen above (p. 135), that wonder and intellectual curiosity are connected. As exciting activity in an unusual degree, wonder tends to intensify any rudiment of intellectual effort which is already excited. When we are in the attitude of curiosity, or disposed to assume this attitude, the feeling of wonder may instantly transform itself into fresh keenness of desire to understand the strange thing. This is the element of truth in the ancient dictum that the desire for knowledge is born in wonder. But there is another side to the matter. Wonder, when fully developed as an emotion, becomes blank, uninquiring gazing. Since, too, it is pleasurable excitement, attention is apt to be firmly held by the stimulating novelty. The result of this would be to divert conative effort from the direction of seeking to clear up, and so to dissolve the marvel, to that of seeking to prolong the enjoyment of wonder. The history of superstition abundantly illustrates how in this way a clinging fondness for the wondrous and miraculous has stood in the way of scientific explanation. The boy who loves to gape at every new marvel supplied by the sensational press is not likely to be a particularly good subject for intellectual training.[1]

From this obstructive action of the emotion of wonder on the inquisitive impulse we must distinguish the discouraging effect of perplexity. This implies that curiosity is active, and that an effort has been made to gain the intellectual mastery of the strange fact or idea. Here, as elsewhere, we have to bear in mind that while the intrusion of a certain amount of difficulty into a conative process may work beneficially, by stimulating a more strenuous effort, formidable obstacles which baffle effort are likely to arrest the process.

As observed above, the love of knowledge is rooted in experiences of joy. This joy is bound up with certain active experiences, the quiet, strenuous activity involved in concentrating the attention on presentations and ideas in

[1] For a fuller account of the emotion of wonder, see *The Human Mind* ii., pp. 32, and 126, 127.

such a way as to reach new knowledge. It was pointed out, too, that this intellectual activity, provided it is not carried to the point of fatigue nor unduly obstructed, has its well-marked pleasure. Not only so, different modes of intellectual activity seem to have their own kinds of pleasure; the gratification, for example, in detecting the finer shades of difference among things and ideas being somewhat other than that experienced in linking two remote ideas by some unobtrusive resemblance.

The fuller enjoyment of this intellectual activity is experienced in more extended processes of inquiry or searching for knowledge. A comparatively passive reception of a bit of information from the lips, say, of a parent or a teacher, even when something of the pain of ignorance has preceded, yields the child far less delight than his own active discovery of it. In the latter case much more intellectual activity is awakened, consciousness is intensified by the rapid passage of ideas, and there is the glow of intellectual excitement. In addition to this, there is an enjoyment analogous to that of the hunter, that of *intellectual pursuit*. In this active quest of knowledge a certain amount of difficulty and delay may indirectly increase the pleasure, not only by spurring the will to livelier exertions, but by adding the keen satisfaction of a triumph over difficulties.

A progressive mastery of knowledge, which every schoolboy should experience, is accompanied by an agreeable consciousness of expansion and of growing power. The learner feels his mind enlarged and strengthened by his new acquisitions (compare above, p. 407). Not only so, where the new elements of knowledge are fully apperceived, and their relations to familiar facts and truths thought out, they bring a new freshness and life into the old stock of cognitions by developing new aspects and unsuspected implications. This applies pre-eminently to the mastery of new general conceptions and truths which may throw an important light on a multitude of more or less familiar facts only dimly understood before.

To a schoolboy, whose notion of delight connects itself with other things than knowledge, the above may seem to be a too flowery picture of the path to knowledge. It is easy for all of us in moments of enthusiasm to forget the thorns which mingle with the flowers along this road. The heroism we ascribe to the scientific discoverer who has doggedly trudged along it, suggests that the search for knowledge may be a feat comparable with that of an Arctic explorer. Even a hard-working schoolboy who is dowered with only average wits may claim a modest share in this dogged pluck of the hero. Yet in spite of its difficulties, the pursuit of knowledge is one of the few directions of human activity which have certainty of reward guaranteed them by their intrinsic pleasurableness.

The Love of Truth. The intellectual sentiment, however, includes more than delight in pursuing knowledge. The very pursuit, indeed, implies some initial sense of the value of what is pursued. The lover of truth not only seeks to extend his knowledge, he is much concerned to test its quality, and he clings to what has proven itself to be truth. He delights in contemplating it, in examining its inner structure, in recognising its sure foundations. This does not mean that he looks on truth as a thing completed and for ever fixed in its form. Knowledge, like the mind which grasps it, is a living and growing organism. The form of a truth, even of a mathematical principle, may change with the centuries. Hence, in a sense, we are ever pursuing and never reaching our goal; and Lessing's well-known saying that of the alternatives, the pursuit and the possession of truth, he would much prefer the former, seems to draw an artificial line between the two. Nevertheless, some truths may be received even by a cautious person as comparatively certain and of permanent validity. The love of truth then, like other loves, is for an ideal, yet for an ideal which is ever being realised.

The love of truth reflects in its structure these two aspects of its object. It is, first of all, a cherishing of what has been adequately tested and found to be truth,

The sincere lover of truth keeps jealous watch over his sacred possession, and resents an approach of the profane touch. On this side, indeed, the sentiment becomes a distinct and fierce antagonism to all who would palter with truth, mar its noble lineaments, or fashion false semblances of it. It includes a strong dislike, akin to disgust, for all the impulses which make for falsity, such as passion and prejudice, slovenliness in thought and expression, the wish to curry favour by tickling foolish ears with "sensational" paradox. Yet, secondly, as the love of what must ever be growing "from more to more," this sentiment implies an attitude of open-mindedness, a readiness to consider new ideas which bear their credentials, and this, too, even when they seem to clash with the old certainties.

The jealous guardianship of truth implies a watchful and critical attitude towards all that is proffered as truth. It has no room for that supine acceptance of mere statement which characterises, for example, the more simple and more indolent sort of newspaper reader. It is keenly alive to the fallibility of all human utterance, and insists on an adequate inspection of sources of information and grounds of assertion. It seeks a full discussion of ideas, so that as much light as possible may be thrown on them; yet it cares but little which side wins in a discussion, if only the truth be more clearly divulged.

Intellectual Sentiment and Judgment. A fine feeling for knowledge and truth implies a readiness to test the claims of human statements, to investigate their logical sub-structure so as to reach clear judgments as to what statements are wholly or partially true and what are false, what "facts" are adequately supported by evidence, what not, what conclusions are perfectly demonstrated, what only shown to be probable, and so forth. The habit of thus critically determining truth-values reacts on the sentiment, not merely by refining and intellectualising it, but by intensifying it. No one is so jealous about the sanctity of truth as he who habitually scrutinises what is

said so as to separate out the pure metal of truth from the alloy of error in which it is apt to be embedded.

Growth of Intellectual Sentiment: Children's Curiosity. As was insisted on above (p. 434), a child is distinguished from a young animal by the possession of a germ of true human curiosity.[1] Even an infant will examine things intently as if bent on finding out what they are; and when speech comes to his help he is apt to plague his far from omniscient instructors by his many far-ranging questions. This germ of intellectual curiosity, however, appears at first only in a weak and sporadic form: disinterested curiosity is rare even among adults. Much of the early curiosity of which fond mothers love to tell is not pure but interested. It is enough to allude to such forms of so-called curiosity as a mere quest of new sensations or emotions, *e.g.*, "Let me taste it too, mamma," "Do show me the pretty picture";[2] vain curiosity, *e.g.*, "What did Mrs. A. say about me, mamma?" animal curiosity, *e.g.*, "What am I going to have for dinner?" as well as the unwholesome forms of prurient curiosity. A pure desire for knowledge only gradually disengages itself from these impure forms.

As already implied, the situation of children among their new surroundings inclines them to wonder and inquire about things. The attitude of curiosity, as a desire to understand, becomes better defined after experience has begun to set up a standard of what is customary, usual or natural in the child's world. The idea of strangeness now grows more clear, and curiosity begins to run out in the direction of assimilating what looks strange and of explaining what looks odd or exceptional. A wider and more intelligent probing of things appears as the child gradually enters into the larger and still more puzzling world which the talk of grown-ups opens up.

[1] How far animals display the germ of a pure disinterested curiosity is a question not easily answered. Darwin appears to endow some of them with this (see *Descent of Man*, pt. i., chap. iii.).

[2] On this "besoin d'émotions,' and other interested forms of curiosity, see P. F. Thomas, *L'Éducation des Sentiments*, pp. 106 ff.

In much of this eagerness of children to get knowledge about their new world there is something which might seem to put to shame the majority of adults. "Disinterested curiosity," writes William James, "may be successfully appealed to in the child with much more certainty than in the adult."[1] Their inquiries often strike us as refreshing, because they have not, like ourselves, grown indifferent to the many unsolved problems which surround them. To this it may be added that in their case the narrowing influences of adult life have not yet begun to confine the range of inquiry to the narrow domain of a few rigidly fixed practical interests. This refreshing aspect of children's curiosity is illustrated in their bolder sort of speculative inquiry into the mysteries of things.[2]

Much of this early curiosity is no doubt fitful and fugitive enough. The feeling of ignorance is not fully excited, nor is the desire to know sustained by a sufficient fund of previous knowledge about the subject of inquiry. Hence the further experience of parents that the young inquirer has often forgotten his question before the answer is given, wandering off to fresh fields of inquiry.[3]

An inquisitiveness sufficiently keen to sustain a prolonged act of attention must be supported by some special fund of interest, which again involves the beginnings at least of those mental systems by help of which the mind fully and clearly "apperceives" the new. These preferential lines of intellectual interest develop themselves gradually, in the case of the individual as of the race, out of practical and personal interests, and are aided by simple forms of æsthetic interest, *e.g.*, a feeling for the prettiness of flowers or shells (compare above, pp. 133 ff.).

As the fund of knowledge about this and that order of

[1] *Talks with Teachers*, p. 47.

[2] See *Studies of Childhood*, pp. 83 ff.

[3] Compare above what was said about children's questionings (p. 347). Savages show a similar fitful and momentary curiosity, soon growing tired of examining new things, and exclaiming, "What is it after all?" See Lubbock's *Origin of Civilisation*, p. 516.

facts begins to grow fuller, inquiry grows more intelligent, questioning more pertinent, and the attainment of new knowledge is seen to bring a genuine satisfaction. The same enlargement of systems of ideas enables the child to follow out processes of thought, and so to realise something ofthe student's delight in the successful search after truth.

The Cultivation of the Intellectual Sentiment. On the question how far it is possible, and if possible desirable, to make learning at any stage a wholly enjoyable exercise, something has already been said (p. 387). It is enough to point out here that the most optimistic of teachers will not count on his children showing at the beginning of school life an enthusiastic eagerness for the knowledge which he supplies. He will have to content himself with rudiments of special interests, and with that curiosity, at once far reaching and sporadic, which is characteristic of the young mind.

With this and his authoritative hold on the child's mind to help him, he will try so to select and present his knowledge material as to bring it into an interesting relation to what the child knows already. In order to do this at all well, he should know something about the common characteristics of children's curiosity, something, too, about those stocks of notions and those rudimentary mental systems which serve to determine the first directions of inquiry.

Setting out with this knowledge, his aim will be at first to restrict and consolidate interest by developing the child's rudiments of mental systems into a more orderly and stable form. Starting from the child's germs of interest, he will seek to open up in an orderly way some of the facts of the natural world, of the history of his country, and so forth. In this way he will give fixed directions to the child's curiosity. He will thus be concerned primarily with the development of special intellectual interests, of a love for this and that concrete portion of knowledge.

At the same time he will aim at something higher, at

nourishing a love for knowledge as such. He can do this to some extent even when specialising, for all methodical teaching of the better sort calls attention to general aspects of knowledge, for example, to the orderly connection between cause and effect which enters into the structure of perfectly organised cognition as illustrated in science. But more than this is needed, namely, the gradual enlargement of the area of knowledge-material presented to the child. The existence of a far-ranging curiosity in the child suggests that we should aim from the beginning at a many-sided interest in things.[1] It is well that, as soon as may be, the young learner should begin to see, if only dimly, the wide expanse of knowledge. Only when he sees this will he begin to develop a pure love of knowledge apart from the special attractions of this and that subject. One of the serious losses which follow a too early specialisation in classics and other subjects in our country is that it leaves the learner unimpressed by the immensities of human knowledge.

In this work of developing a love of knowledge, the teacher must aim at a *pure* intellectual sentiment. The exhibition of a precocious pragmatism in the young, as in the recurring question "Of what use is it?" must be met by emphasising more and more as intellectual progress advances, the intrinsic desirability of knowledge. A teacher may even be absolutely right in insisting in certain cases on the uselessness of much that is learnt, save as a source of pleasure and as a qualification of the educated man capable of entering into full possession of the rich fruits of civilisation.[2]

As the nursery of a love of truth, the school may be said to be still on its trial. The synchronising of a widely diffused habit of "tit-bit" reading with the recent "spread of education" is ominous in this connection. If the school

[1] On the awakening of many-sided interests, see Felkin's *Introduction to Herbart's Science and Practice of Education*, chap. iii.

[2] For an opposite opinion of the "senseless policy" of such insistence, see Keatinge, *Suggestion in Education*, pp. 67, 68.

is to breed lovers of truth eager to enlist under her banner it must attempt much more than it has yet attempted. Even the opportunities it has, it does not seem to appreciate. Boys are hero-worshippers, and it ought to be easy to rouse their admiration for the dogged pluck, as well as for the splendid courage, of some of the pioneers in the discovery of new truths. Yet how many science masters, one wonders, think it worth while to take their pupils back to the glorious pages in the history of science? The best thing, however, that any teacher can do in cultivating a love of knowledge is to infect his pupils with his personal enthusiasm. A master who shows a genuine warmth of interest in the subjects he teaches may possibly provoke a smile in a certain unpleasant kind of boy; yet he can hardly fail to kindle some kindred heat in the breasts of his better pupils.

The proper time for quickening to fuller life and vigour the love of abstract truth is towards the end of the school-life. Teaching should now be supplemented by exercising boys in a freer critical estimate of matters coming within their intellectual reach. For us of to-day, as for the ancient Greeks, the love of truth must be nourished by that penetrating many-sided inspection which discussion, with its interchange of ideas and points of view, supplies. Such training might well include some study of elementary logic, a subject strangely neglected in our secondary schools. A special aim in this early development of a love of truth should be to work against that craving for what is new and startling which is so apt to enter into, and render impure, the eager inquisitiveness of the young.

For the many boys who leave school for the world at an early age Continuation Schools are needed, the function of which would be, not technical, but a higher stage of general education. In these the work selected should be directed to the cultivation of general intelligence, the encouragement of serious reading and discussion, and the fostering of those habits of painstaking investigation and

critical discrimination which enter into a genuine concern for truth.[1]

(*b*) The Æsthetic Sentiment.

The second of the two abstract sentiments is commonly spoken of as the æsthetic sentiment. It is clearly a variety of the love type, and is indeed often described as the love of beauty or beautiful things.

Characteristics of the Love of Beauty. A glance at things which we call beautiful shows us how varied they are. They include among natural objects things so dissimilar as a flower, a mountain chain, and the murmur of a summer sea; among works of art things differing so widely as a cathedral, a cameo, a painting, a poem and a sonata.

The love of beauty seems to include our richest and purest joys, what we specially mean by delight. We call a thing beautiful because it immediately excites pleasurable admiration. Hence, in spite of its abstract and ideal character, beauty calls forth a warmth of sentiment and an attitude of tenacious clinging. At the same time, as already implied, the sentiment has its disagreeable side. Sensitiveness to the beautiful aspects of things exposes its possessor to many unpleasant experiences, to the disgusts and recoilings excited by the appearance of ugly things.

One distinguishing characteristic of this sentiment is its calmness. This comes from the peculiar character of æsthetic enjoyment. We may no doubt, as when listening to a certain kind of music, be roused to a pitch of emotional excitement; but, in general, beauty imposes on us, as one chief condition of its enjoyment, the quiet attitude of contemplation. When looking at a picture or listening to the recital of a poem we have to get away from all disturbing passion, as well as from all wearing practical concerns, and to become pure contemplators. This contemplation, again, though it may involve much intellectual

[1] See the author's paper in the *Proceedings of the International Congress of School Hygiene* already referred to.

activity of a kind, is untrammelled with any pressing need of acquiring knowledge. It is spontaneous, self-sustained activity, directed to no end outside itself, only to the prolonging and increasing of the contemplative enjoyment.

This quiet joy of æsthetic contemplation comes to us primarily through one of the two higher and more refined senses, namely, sight and hearing. The materials and the forms of beauty are apprehended by sense-perception of a particular kind, that is to say, by a selective perceptual contemplation of certain aspects of objects, such as the glow of colouring in a landscape. The object of beauty may, however, be presented not to sense-perception but to imagination, as when we read a poem and imaginatively realise the scenes and actions described. Yet even in this case, too, the beautiful object is presented through a sensuous medium, the verbal form actually heard or at least heard with the inner ear. The feeling for beauty has a high degree of refinement. This comes, not only from the refined character of the two senses engaged, but from that of the perceptual and imaginative processes involved.

On the other hand, the conative aspect of the sentiment is less vigorous and conspicuous. To an extremely active person, to sit down and contemplate a picture is apt to look like an indulgence in the sin of slothfulness. Yet there is a conative process in the careful inspection of a beautiful object as such. This factor appears more clearly in the effort of the genuine lover of beautiful things to surround himself, so far as possible, only with the objects of his delight. It becomes still more prominent in all modes of artistic production.

Constituents of Æsthetic Enjoyment. As in the case of the love of knowledge, we have here to glance at the chief sources of the enjoyment on which the sentiment may be said to be based.

(1) The first and simplest constituent of æsthetic experience is clearly *sensuous*. The colours and tones, if not the linear elements of form also, which have æsthetic

value are intrinsically pleasing. A pure tone, a gently curving line, probably answers to the most perfect or favourable mode of stimulating the sense-organ concerned. Again, the many gradations of the colour and of the tone scale offer a rich variety of pleasing sensuous material for combination in complex wholes.

(2) Sensuous material, however, would not, by itself, give full æsthetic enjoyment: *a perceptual process* is needed[1] which shall discriminate and relate this material in pleasing temporal and spatial forms. A beautiful flower or tune gives us this pleasing whole made up for the greater part, at least, of pleasing parts. The appreciation of the beauties of painting, architecture, and of music and poetry, implies a considerable power of contemplative construction of such harmonious wholes, in which elements and relations alike contribute to the pleasing result. The fulness and refinement of the appreciation will depend on some clear discernment of the pleasing elements and their relations. It is probable, too, that both the materials and the combinations of these which have special æsthetic value are such as satisfy the conditions of agreeable attention: what is obscure, confused and lacking in form displeases by baffling the impulse to attend both to the parts and to the whole.

(3) Æsthetic experience is not confined to the perceptual level, but involves *ideational processes*. More particularly, it is enriched by the activities of imagination. This factor has by some been marked off from beautiful form as "ideal content". This begins with an apperceptual process, an imaginative apprehension of what is seen or heard by help of some pleasing analogy. The simplest illustration of this is the transformation of things by a sort of æsthetic personification or self-projection into the object, as when we say that the tower "lifts its head," the torrent "hurls itself down," or the sea "rages". By certain German writers this self-projection into the æsthetic object (*Ein-*

[1] The word æsthetic (from Greek αἴσθησις) primarily refers to a sense perception.

fühlung) has been made the fundamental process in æsthetic enjoyment. This seems to be an exaggeration, yet the poetic vitalising of physical objects, even of those which are motionless, naturally grows out of the dream-like mood of æsthetic contemplation. In certain cases this imaginative element in our æsthetic enjoyment becomes large and predominant, as when we contemplate a delicate Alpine flower or an old decaying castle.[1]

This æsthetic enjoyment may come to us from the contemplation of a natural object or of a work of art. The two kinds of experience differ in certain respects. Art appeals to us as a human production, as the outer embodiment of a certain feeling, idea and intention in the artist. This clearly introduces a new expressional aspect into the picture or other artistic production. It also adds a new relation to the work of art. In so far as the "imitative arts," namely, painting, dramatic spectacle and poetry, aim at presenting some phase of nature or of human life—modified, no doubt, and transformed by the medium of artistic semblance employed—a part of our enjoyment in contemplating one of their productions arises from a recognition of its artistic truth.

Æsthetic Feeling and Judgment. In the case of this sentiment, too, there is a close connection between the feeling for an object and the appreciation of its value. We at once perceive and enjoy the beautiful aspect of a flower or of a statue. That is to say, we discern something which has worth for our feeling. Æsthetic culture involves the development of this intellectual side of æsthetic contemplation, the rendering as clear as possible our perceptions of the aspects of things which afford æsthetic pleasure. This discernment is the basis of a clear appreciation of æsthetic values, and the setting forth in words of such a value is known as an Æsthetic Judgment.

What it is precisely which constitutes beauty is a much-

[1] On the meaning and value of "Einfühlung," see the writer's article on "Beauty and Expression" in the *Edinburgh Review*, October, 1908; *cf.* Judd, *Psychology* (Gen. Introduction, pp. 205, 206).

discussed question that still awaits its solution. These theoretic uncertainties find their counterpart in our judgments in matters of taste. The proverb, "De gustibus non disputandum," illustrates this appearance of irregularity or want of law in our æsthetic experience. Yet the lawlessness in this case is less than it looks. Since æsthetic experience is essentially feeling, and highly complex feeling too, we must not look in it for perfect uniformity. Yet, while individual tastes vary, often in a capricious way, we find that they have not all a like value. The value of an æsthetic judgment varies with the width and variety of the person's æsthetic experience, and with the amount of critical reflection which he has brought to bear upon it. A competent judge of æsthetic values is one who has had the preparation which comes from a long study of beauty, more especially as embodied in the great art-works of the world. Now though, as we know, experts on these matters of art are far from being in perfect agreement, they do agree in more or less consciously recognising certain principles of beauty which are illustrated, in very different ways no doubt, in the art of different peoples and of different epochs, for example the presence of a harmony of parts. Such principles help us, to some extent, to define more precisely the several kinds of æsthetic value, and to set up standard conceptions of what is truly beautiful.

Taste is sane when it shows a normal liking for colours and other commonly recognised elements of beauty. It is abnormal when it prefers what men in general dislike, such as sickly colours for wall-papers. Again, it is enlightened and refined, or common and coarse, according as it is capable of discerning much, or little, in the great embodiments of beauty, whether natural or artistic; also of discriminating what has more from what has less æsthetic value. Culture, of a healthy kind, though it leaves intact the early loves for simple beauties, such as the colours of flowers and the songs of birds, enriches and refines the taste by bringing greater complexity and richness, as well as nicer discrimination, into our æsthetic perceptions.

Development of Æsthetic Sentiment. The feeling for beauty in its higher and more refined form is a late attainment for the individual, as for the race, presupposing as it does an advanced stage of intellectual and emotional culture. At the beginning of life we find a great and impressive absence of our familiar æsthetic likings. Moreover, such crude germs of æsthetic feeling as children show are impure, bound up with self-feeling, *e.g.*, vanity as to dress, and other non-æsthetic feelings.

Among the first sensuous objects to attract this early liking are bright colours and sweet sounds. Preyer says that his boy seemed pleasurably excited at the sight of a rose-red curtain at the early age of twenty-three days. In the case of another child a fondness for a gilded and coloured card was clearly displayed at the age of seven weeks. The pleasing effect of bright colour is of course increased when the object is moving, as in the oscillatory movements of sunlight on the wall of a room, or the paper birds which Pestalozzi recommends mothers to hang over the cradles of their infants. Musical sounds, when not disconcertingly loud, may give pleasure to an infant as early as on the twenty-ninth day.[1] Rhythmic arrangements of sound are pleasing certainly in the second half of the first year.

This crude appreciation of pleasing rhythms in sounds is probably the first dim manifestation of an æsthetic perception of form. The appreciation of tone-relations or melody develops later; still later, that of colour-relations and of such relations in spatial form as symmetry. In the first dim æsthetic consciousness the contemplation of wholes as made up of a number of parts is scarcely present, attention being directed to some attractive detail, such as the coloured spots on a flower or animal.

As has been pointed out above, a child has his own way of projecting the self into objects; and this direction of his fancy brings him a quasi-æsthetic pleasure. At the

[1] See Miss Shinn, *The Development of a Child*, ii., p. 115.

same time, his æsthetic enjoyments are limited by the want of the experience and the imaginative power required for giving the richer kinds of meaning to what is seen. For the child the ruined castle has no pleasing sadness, the mountain no soul-expanding sublimity.

Æsthetic development means the growth of a more refined feeling for the less obtrusive parts of the sensuous side of beautiful objects. Thus, as a child's colour-sensibility develops, he will enjoy less gaudy effects of colour. Concurrently with this advance, there will appear, as analytical inspection becomes possible, a clearer apprehension of pleasing relations of colour, as well as of spatial and temporal form. Again, as experience and knowledge advance, and the range of imagination and ideal emotion enlarges, the child's enjoyment of the æsthetically valuable suggestions of things, of their ideal content, will grow fuller. A flower, for example, will acquire a deeper charm for a child who comes to know its delicate structure and its short, fragile life; for whom, too, it acquires meaning as a symbol of the free joyous life of the country, and who, under the guidance of the poet, learns its higher, spiritual significance.[1]

The æsthetic sentiment needs for its fuller development some of the experience of the artist. The impulse to draw, to build, or otherwise fashion things, is a strong impulse in the child as in the race, being rooted not only in the love of activity but in that of giving outward form to ideas and of creating semblances of objects, both seen and unseen. Schiller and others regard art as akin to play, and certainly a good deal of quasi-artistic activity comes into children's play.[2] Even a one-year-old child will enter into the spirit of a little play-like dramatic performance, and will begin to fashion semblances with bricks, paint-brush, or pencil. The early experience in artistic production of a simple kind serves to direct attention to things

[1] For a fuller account of the early development of æsthetic feeling and appreciation, see *Studies of Childhood*, ix.

[2] See *Studies of Childhood*, p. 321 ff.

of æsthetic value, such as individual shades and relations of colours, symmetry and proportion, and so promotes a clearer insight into the beautiful side of things; and, as an experience in expressing ideas and in fashioning semblances, it will add a new significance to the real works of art which the child sees.

As implied in what was said about the æsthetic judgment, it is long before a child can begin to appreciate values and judge of the beauty of things. His first crude attempts to form a simple judgment, such as "my dog has a pretty head," are hardly more than echoes of what others, more particularly his mother, have said. In no part of a child's development, indeed, is the influence of environment, of the lead of others, more strikingly shown than in that of æsthetic appreciation. When children are tested as to the æsthetic impressions which they receive from pictures they reveal a strong propensity to set the content of a picture above its form, and to indulge in a plenitude of emotional predicates, such as "sad," "horrible," "wild," "deserted".[1]

The æsthetic judgment, after it has begun to appear, passes through well-marked stages of development. (*a*) In the first stage it is emotional and individual. The child in calling a colour "nice" or "pretty" means merely that it pleases him. In other words, the beautiful object is envisaged simply as a source of pleasure to himself. (*b*) A somewhat higher stage is reached when the child in calling a thing "pretty" means that it pleases others as well as himself: when he begins to recognise that what pleases himself is a source of common enjoyment. At this stage he will begin to ascribe a quality of beauty to certain objects which please him and others. (*c*) A yet higher stage is reached when he begins to reflect on the things which please him and others, carries out processes of analysis and comparison, and so reaches some insight into what makes a thing beautiful. The judgment can

[1] Meumann, *op. cit.*, i., pp. 283, f. On children's mental attitudes towards pictures, see *Studies of Childhood*, pp. 309 ff.; Meumann, *loc. cit.*, p. 286.

now take on a more rational form. The rose, for example, will be seen to be beautiful because of its gradations of rich colour and of its softly unfolding petals.

In this account of the æsthetic sentiment and its development we have kept to the feeling for beauty in the narrower sense of the term. The modifications of the sentiment which we call the feeling for the sublime and for the comic do not call for much consideration in a work on educational psychology. Not but that a child may show a germ of each of these modified forms of the sentiment. He has a sort of admiration for big things as such; yet this, like its travesty, the megalomania of adults, falls short of a genuine sense of sublimity. Children are at once too prone to fear, and too incapable of grasping the "ideal content" of sublime objects, to reach the reverent yet joyous attitude which these call forth in us. As to a sense of the comic, children have no doubt their own standards of what is laughable; and they have glimpses of what we call comic, ironic and so forth. Yet for the greater part their laughter at things falls short of a genuinely æsthetic feeling by the admixture of too much of the personal and coarser element. This partiality for the laughter which has in it a good dose of cruelty, together with the lack of an adequate amount of sympathy and of reflective insight, keeps the humour of boys not much above the level of that of the savage. This state of things is apt to be disappointing to parent or schoolmaster who has a humorous bent and looks for sympathetic responses.[1] Yet the teacher, at any rate, might find it worth while to do more to develop "a higher sense of humour" in his pupils.[2]

The Education of Taste. The education of the feelings may be said to culminate in the development of the æsthetic sentiment. This branch of culture owes its educational importance to the fact that it tends to refine the

[1] On the laughter of savages and children and its relation to more refined forms see my *Essay on Laughter*, chapters vii. and viii.

[2] See an article, "Imaginative Elements in the written work of School-Children ('Results,' v.)," by S. S. Colvin and I. F. Meyer, *Pedagogical Seminary*, 1906.

feelings, to detach them from personal concerns, and to connect them with objects of common or universal appreciation; and by so doing greatly to widen and elevate the child's sources of happiness.

Since the environment and the example of elders have so large an influence here, our first concern must be to secure pretty and tasteful surroundings in the home and school. It is our early habitual surroundings which determine the first directions of our love of beauty; and the arrangements of the home and the school impress the child as standards of what others think pretty. Plato was well aware of this vital influence of beautiful surroundings in the first years.[1]

Suitable pictures and works of art in the home and school will not, however, be all that is needed for a fostering æsthetic environment. By themselves they could only develop a one-sided and artificial liking for what is pretty. A feeling for beauty is born, both in the race and in the individual, from daily contact with nature—with the living things, both plants and animals, the flowing streams, etc., which children spontaneously love and call pretty. A love of nature on her winsome and lovely side is the proper stepping-stone to a love of art.

Yet even when nature and art thus co-operate the mere environment cannot of itself fully educate the love of beauty. As we know, children may be brought up amidst lovely natural surroundings and yet not acquire an æsthetic feeling for beautiful scenery. It is for the mother or other educator to direct the child's attention to what is beautiful in his surroundings. Such a simple action may suffice to disclose a beauty which the child would otherwise have missed. George Sand tells us that when, in her fourth year, she travelled into Spain with her mother, the latter used to say on coming to some new scene, "Look! how pretty that is," and she adds: "Immediately these objects, which I should not have remarked of myself, revealed to me their beauty".

[1] See the *Republic* (iii., C and D).

A good deal of tact is needed in this early guidance of æsthetic likings. Foolish parents will sometimes take children to the Swiss mountains or to a picture gallery, and express surprise that they seem so blind to the beauties of what they see. A child will find more delight in a bunch of cowslips or in a little basket of sea-shells than in the grandest of the works of nature and of art.

From an early age a child should be trained to appreciate the simpler productions of art—simple pictures and simple melodies. In these days of good coloured reproductions both the nursery and the classroom might be more extensively used in familiarising children with simple examples of good pictorial art, to serve as standard examples of what is truly beautiful.

The influences of nature and art interact in this development of the æsthetic sentiment. Some contemplation of the beauties of earth and sky is a necessary condition of a full appreciation of art. Yet the love of art reacts on our love of nature. A work of art is much more than a mere photographic reproduction of some one of nature's scenes. It selects, modifies, rearranges the æsthetic material supplied by natural objects so as to give us more than nature gives, to detach and emphasise for us some phase of its beauty. As Fra Lippo Lippi says in Browning's poem :—

> . . . we're made so that we love
> First when we see them painted, things we have passed
> Perhaps a hundred times nor cared to see.

Æsthetic culture has, therefore, to employ art of a suitable kind as its chief instrument.

It follows from what has been said that æsthetic culture must include some practice in simple forms of art-production. It is by drawing or painting a flower or other beautiful form that a child is led on to that intimate knowledge of it which is necessary for a fuller appreciation of its loveliness (compare above, pp. 188 f.). In addition to this, artistic production appeals to those spontaneous impulses to make things, to imitate and to create, which are strong in most

children. Recent inquiries show that, while children differ more in their artistic capabilities than in their observing powers, a fair number show real artistic talent as early as the age of seven or eight. The same inquiries have taught us that the ability to represent objects is distinct from that of decorating them.[1]

In æsthetic culture great care is needed lest we hurry the process of natural and normal growth. The impulse of the fond parent to bring the child at once up to, or near, his or her level tends in this case to induce a certain affectation of taste, a blind or at least half-blind repetition of what others say. "Æsthetic jargon" is by no means unknown among children of artists and other extremely "æsthetic" persons. "Nothing (remarks Jean Paul Richter) is more dangerous for art, as well as for character, than the expression of immature feeling."[2] Children should be allowed, and when necessary encouraged, to relish the simple æsthetic enjoyments proper to their age, such as that of pictures with gay colouring, and of simple tunes with well-marked and taking rhythms.

The judicious educator will, further, study and respect the child's individual preferences so far as these are genuine. He will, moreover, not exact absolute conformity in a region where there is so wide a margin for individual variations of feeling.

The cultivation of the æsthetic sentiment, while it requires a special course of training, connects itself with, and may in a sense enter into, other departments of education. On one side it stands in close connection with intellectual education. The feeling for what is graceful and has something of artistic finish and worth may be developed to some extent in connection with such seemingly prosaic exercises as learning to read and to write. Training in a nicer use of the mother-tongue in vocal recitation and

[1] See Kerschensteiner, *op. cit.*, §§ 6 to 10, and M. Macmillan, *Education through the Imagination*, chapter on "The child as Artist".

[2] See his valuable remarks on the "Cultivation of the Æsthetic Sense," *Levana*, translated by Susan Wood, eighth fragment.

written composition—a sadly neglected branch of education in these days—offers a wider field for this culture of a feeling for what has something of the charm of artistic perfection. Many branches of study when fully carried out act directly on the growth of the æsthetic sentiment, and owe much of their interest and value to this circumstance. This is pre-eminently true of the study of literature, both our own and that of other nations. Such studies, if at all thorough and carried far enough, should develop not only a sense for the values of words, but an appreciation of literary form, of the clothing of the great productions of imagination and thought in a worthy expression.

On another side, the training of the æsthetic sense connects itself with moral training. It bears on this indirectly by serving to moderate the turbulence of natural emotion, and to enlighten it in attaching it to clear perceptions and ideas. A child that has learned calmly to contemplate and appreciate beautiful things is prepared in a measure for the other kind of calm appreciation, a just estimate of a good action. But there is a yet closer connection between æsthetic and moral culture. Without following certain Greek thinkers in identifying the beautiful with the morally good, we may say that our admiration for what is beautiful in human action and character embraces their moral aspect. The joyous thrill which we experience when we hear of some act of heroic bravery, or of noble self-sacrifice, implies an appreciation at once of moral and æsthetic value. Hence the special importance of exercising the young in this direction of æsthetic admiration. History and literature of the best kind give to the educator ample opportunity for such exercises.

In conclusion it may be noted that the æsthetic and ethical aspects meet in many matters of "minor morals," such as habits of cleanliness and neatness, of orderliness, of courtesy and good manners. These are at once among the lesser duties which count, and things which have a pleasing æsthetic aspect. Even in graver moral matters

the addition of the charm of grace and finish of form is not to be despised. There is, for example, a more awkward and a more gracious and charming way of performing an act of kindness. These graces of manner have their modest place and value in the beauty of our world.

(c) The Moral Sentiment.

The last of the three Abstract Sentiments is usually spoken of in scientific books as the Moral or Ethical Sentiment. In popular language it is apt to be named after one of its prominent aspects, as the feeling of Obligation, the reverence for Duty or the Moral Law, the love of Virtue.

Characteristics of Moral Sentiment. As these names at once show, the sentiment is sharply marked off in its structure from the other two. With regard to the relation of the affective or emotional to the conative side of a sentiment, we may say that in the Intellectual Sentiment the two are fairly balanced; that in the Æsthetic Sentiment there is a clear preponderance of the affective side; while in the Moral Sentiment the conative side is preponderant. By this is meant that our moral consciousness has a direct practical outlook, concerning itself with human conduct and the qualities or dispositions which determine this.

Another distinctive feature of the sentiment grows out of this one. In an ideal world men's actions might be the object of a purely joyous attitude akin to æsthetic contemplation. But things being what they are, in thinking about and valuing conduct we have to keep in view its bad as well as its good aspects. From the point of view of the State, and of government in general, the avoidance of bad conduct is the primary and more pressing aim. And primarily, at any rate, in thinking about our own conduct, we find it needful to lay emphasis on the shunning of what is wrong. Thus, the unpleasant side of the sentiment, that indicated by moral condemnation of, and aversion from, what is bad, bulks large in its

constitution. Hence, the sentiment is in general of a graver and more sombre hue than the Love either of Truth or of Beauty.

Structure of Moral Sentiment: (*a*) **Self and Duty.** The moral sentiment is characterised by its great complexity and the number of dissimilar feelings which enter into its structure. Primary emotions are to be found in it under the form of emotional dispositions modified by the whole system; for example, the fear of wrongdoing, the anger of righteous indignation, and of the sense of injustice. Other feelings which enter the system and help to colour it are the disgust and contempt felt for certain kinds of vices and faults.

Again, the moral sentiment seems to take up into itself some of the more concrete sentiments spoken of in the last chapter. There is an element of antagonism and of hatred in the attitude of a morally sound boy towards wrongdoing, just as there is something of the warmth of affection towards good conduct, since, as we have seen, in the early stages of moral consciousness moral badness and goodness are viewed and reacted to as qualities in particular persons.

We gain a clearer insight into the peculiar structure of the moral sentiment when we regard it as a special form of the self-feeling modified by a number of other feelings and sentiments. Moral consciousness is, at the outset and throughout its development, an attitude of the individual towards something felt to be larger and higher than himself. It thus implies a distinct form of self-consciousness. This, in the lower stages of development, has much of the character of an antagonism: the rebel in the boy is disposed to regard the moral commands, "Be just," "Be kind" and so forth, as aiming at crossing his natural inclinations and diminishing his happiness. Yet, so far as the sentiment is genuinely moral, the self is on the way to reconciliation with its seeming foe. That is to say, the boy recognises that the moral law is more than an irksome restraint on his wishes, that it speaks with authority and urges a

valid claim on his obedience; and, as a result, he tends to assume a submissive attitude towards it.

It is this double feeling, a sense of opposition and a sense of conciliation and submission, which forms the core of moral experience and gives its character to the moral sentiment. The sense of obligation, of *oughtness*, always remains: whence the general gravity of the moral attitude. But as the better self comes on the scene of consciousness and gains strength, the attitude of loyal acceptance brings relief from strain and something of quiet joy with it—a sort of peaceful self-complacency, toned down and kept far from pride by the fact that it is submission, and that it is never ideally complete.

It is evident that in this acceptance of moral commands our supposed boy is moving from the standpoint of "self-will," of a narrow egoism, towards that of the community. Although the precise relation of morality to social welfare may still be discussed by philosophers, more practical thinkers are agreed that what we mean by right conduct is social service, including both the avoidance of injury to, and the promotion of the well-being of, the community of which we are a part. To this fact there answers the other fact that, as we have seen, the community has a developed moral sentiment, and upholds the moral law, requiring at least a general conformity to it in its individual members. This being so, our supposed boy in taking on the moral attitude is developing a new and higher form of the Social Self. He feels himself united in a new way to his social world. The higher attitude towards duty is sustained by the social feelings of the boy himself dealt with in the last chapter, such as the wish for others' good opinion, the personal affections, and the sympathetic dispositions. Hence the loyal acceptance of the moral law takes on something of the warmth of a true affection.

(*b*) **Moral Sentiment as Love.** The perfect reconciliation of the self to duty here briefly traced prepares for a higher and more joyous aspect of the moral sentiment, the love of virtue. When the attitude of loyal acceptance

is once assumed, goodness will begin to wear the aspect of something nobly attractive. Our illustrative boy, in trying to be good, brave and truthful, will feel the attractive force of the ideas of goodness, courage and truthfulness. The ideal self, which now begins to take on definite form, will seem to be something higher and glorious, worthy of a long and strenuous pursuit. Not only so, being now on the side of the community in upholding duty and in furthering goodness, he will be qualified to appreciate others' actions and dispositions with a clearer vision.

This happy transmuted form of the moral sentiment deserves to be called a Love. It will have all the warmth which the social feelings have contributed. Indeed it will ally itself closely to the love of humanity, since moral excellence is what we value most highly in men. It will, moreover, have something of the ideality of the other abstract sentiments. The good man is one who, though he never loses sight of the pressing practical side of duty, develops a large moral outlook, dwelling with Plato on lofty ideal forms of moral excellence.

Moral Sentiment and Moral Judgment. Here, as in the case of the other abstract sentiments, the emotional system is closely bound up with a process of judgment. An enlightened moral sentiment implies, not only a fine emotional susceptibility, but a fine discernment of what has moral quality, both in conduct and in personality or character. In other words, appreciation of quality, in this case too, means the ability to give clearness to our perception in the form of a judgment, such as "this is a lie" or "a bad lie"; "this action shows a kindly disposition".

Here again we may distinguish stages in the development of the judgment. (*a*) First comes the stage of *subjective feeling*, as when a child calls another child "naughty" because he offends him in some way, as by striking him or seizing his toy. (*b*) In the second stage the child recognises, more or less clearly, the *objective* character of morality, that "right" and "wrong," as moral epithets, refer to what is approved and disapproved of by

The most valuable fruit of a habit of such sympathetic reaction to wrong-doing is a disinterested repugnance to one's own wrong action. As every intelligent mother knows, the really hard task for a child is to realise by sympathetic imagination the result of his own naughtiness. It is an epoch-making stage in moral development when he first learns to put himself at the point of view of the child that he has wronged, and from this new sympathetic point of view to look back on himself with a feeling of self-condemnation. When he has reached this stage, he is near some realisation of the universal validity of moral relations.

The higher developments of the moral sentiment involve, not only a deepening and quickening of the feelings, but a considerable enlightenment of the intelligence. In order to discern all the elements which give the moral complexion to certain kinds of action, and in order to draw the nicer distinctions between one kind and another, a fine imaginative power and a fine discriminative judgment are necessary. Hence, a ripe moral faculty is rarely if ever attained in youth.

As we have seen, the moral sentiment assumes more of the aspect of a warm joyous love when it becomes an enthusiastic worship of virtue, and an eager aspiration towards the realisation of an ideal moral self. This attitude has for its underlying process imagination touched with emotion. Youth is emphatically the time for the growth of such moral ideals. Inquiries have recently been made by Prof. Earl Barnes and others as to the spontaneous development of such ideals among children. The inquiry took the form of a "questionnaire," that is to say, a collection of answers to a question of the form: "What person would you most like to resemble?" The results seem to show that many boys and girls do spontaneously begin to form such ideals, some taking their ideal model from real life, and a smaller number from books. Yet this line of inquiry is evidently exposed in a peculiar way to the risk of obtaining answers invented *ad hoc*, and more

particularly such as are likely to please the inquirer (see above, p. 9).[1] You can sometimes get a glimpse of what a child really cares for in the way of human quality by listening to his prayer, *e.g.*, the request of a little girl that God would "make all the wicked people good and all the good people nice".

The Cultivation of the Moral Sentiment. The problem of developing the moral sentiment is intimately connected with that of educating the will and forming the moral character. Yet we may consider it to some extent apart from volition, that is to say, as organised feeling and correlative intellectual process.

The action of the social environment stands out clearly in this case, the very condition of childhood imposing on parents and others some amount of systematic government. The character of the early government of the nursery is apt to have a decisive influence in determining the first attitudes of the child towards duty. Its beneficial moral influence, as will be explained later, depends on its being a system, that is to say, a number of rules clearly set forth and properly co-ordinated so as to make a consistent whole; and further a system shown to be valid for all alike.

Again, the educative effect of any system of early government on the moral feelings will depend on the spirit and temper in which it is enforced. In some homes, where parents are weakly fond, government is apt to show itself wanting in its first essential, namely, seriousness. Such weakness may make early moral control worse than useless, by turning it for a life-time into something to be made light of: for not every child spoiled in the first years will wake up when the fond mother is removed, as little Daniel woke up in Alphonse Daudet's story, *Le petit chose*.

When the control is seriously undertaken, one of the most important conditions of its moralising influence is that the parent or teacher should never be carried away by

[1] See W. B. Drummond, *An Introduction to Child-Study*, p. 287; Stanley Hall, *Youth*, ix., "Growth of Social Ideals"; also Meumann, *op. cit.*, i., pp. 290 ff.

violence of passion. The moral sentiment is impersonal, and the first expressions of it by the educator should bear the impress of a judicial calm. This does not mean that when administering discipline, he is to disguise his personality under the form of a cold, lifeless abstraction. He must show that his feeling is not only a calm, disinterested sentiment, but one warmed through and through with affection.

The perfect infusion into early moral education of the warmth of the educator's own feeling involves the constant and noiseless action of that atmosphere which encompasses a good personality. A child comes under the influence of this atmosphere when, for example, he begins dimly to realise that his mother is a lover of truthfulness, and half-unconsciously to assimilate something of her steady loyalty. A warm as well as respectful affection for a teacher similarly disposes the child to assimilate his moral ideas and feelings.

The higher kind of education of the moral sentiment will include a large and habitual appeal to the child's sympathetic dispositions. The educator will need again and again to direct the child's attention to overlooked effects of his conduct, *e.g.*, to the discomfort and even pain which his rough play causes to "pussy". Speaking generally, the drawing out of humane consideration for animals and human weaklings is comparatively easy, so much of the seeming cruelty of children being due to a lack of the emotional imagination. On the other hand, the employment of sympathy as a moral instrument must be judiciously restricted. Children, like many adults, are apt now and again to be obsessed by their strong passionate sympathies so as to fail to see whither the quiet impartial finger of justice points.

A higher stage of the educative process is reached when the teacher begins to exercise the child in moral reflection, in penetrating to the grounds of our distinction of right and wrong actions and dispositions. This will be at once a process of moral instruction and of the stimulation of

the moral feeling. Here the moral situations and experiences arising out of the social life of the school should be utilised. Morality takes on reality only when it is reached through the individual's own concrete experiences.[1] In connection with this, he should be trained in comparing moral situations so as to acquire a certain readiness in discriminating and recognising rightness and wrongness under their manifold concrete forms. In this more realistic direction of moral instruction, attention will have to be directed both to what is bad and to what is good. The familiar phrase "children's faults"—to which, alas! no approving term corresponds—shows that the teacher is likely to do justice to this side of his theme. Yet since goodness and badness are related, psychologically, as well as logically and ethically, we do well to set forth the meaning of a lie by placing it in juxtaposition with truth-telling, and to aim, not merely at correcting faults, but at setting up barriers against evil-doing by exercising and strengthening the love of what is good.

Yet the illumination of a child's moral consciousness requires more than such references to the limited experiences of childhood and the school. Since education, while starting from the child as he is, keeps its eye fixed on the goal—the individual as we wish him to be later—we need to illustrate many parts of the domain of moral activity which do not come within the limits of the child's moral experience. It requires, for example, instruction in civic duty, in the social service which is rightly asked of every member of a society, though it may be long before he is called upon to fulfil these duties. For this reason alone, moral instruction needs to adopt a wide scope, to go to history, to biography, and even to fiction for examples of the right and the wrong sort of conduct to be specially dealt with. The rule of progress in this case is that of

[1] The importance of beginning moral instruction by a reference to the actualities of the children's own moral experience is emphasised by Dr. Fr. W. Foerster in a paper "Zur Methodik des Ethischen Unterrichts" in *Papers on Moral Education: First Internat. Moral Educ. Congress*, 1908.

all imaginative extension of experience: an adequate basis of actual first-hand knowledge must be reached before the supplementing work of imaginative construction is added.

Again, this enlargement of the field of moral instruction is required in order to secure the full warmth and impulsive force of the moral sentiment. Formal intellectual exercises are apt to seem cold and "preachy" to children. Yet by going to the pages of history, biography and fiction we may find exalted instances of courage, of devotion to country, of fidelity to truth. Such great examples serve as Bacon's "prerogative instances" which exhibit the quality to be illustrated in an exceptionally clear manner, and at the same time as stimulating ideal representations fitted to arouse the learner's feelings, and to call forth his aspirations towards what, as ideal, draws us upwards. The moral lessons of Mr. P. J. Gould on self-reliance and other moral qualities should satisfy the most sceptical that moral instruction can be made at once informing to the intelligence and stimulating to the moral sentiment.[1]

The formation of a complete ideal conception of the good man or woman means much more than this appreciation of, and aspiration towards, ideal embodiments of particular virtues. Children's ideals are apt to be fragmentary and incomplete just because their imagination follows these somewhat abstract lines. What is needed is some more complete and living conception of the good person, the perfect human character. This can only be reached later and gradually. It involves an insight into the organic unity of the moral life, into the way in which the several forms of moral excellence are connected in one ethical whole.[2]

The problem of determining the exact relation of intellectual to moral culture is one which has perplexed men's minds since Socrates taught that all virtue is a kind of knowledge. It seems clear that some enlightenment of the

[1] See his *Children's Book of Moral Lessons* (Watts & Co.), 1905.

[2] On the defects of early moral ideals and on the mode of correcting them, see Prof. J. MacCunn, *The Making of Character*, part ii., chap. ix.

intelligence is essential to the growth of a refined moral sentiment. It is no less clear that this process of instruction is a fundamental part of moral culture. At the same time moral education is much more than an exercise of a child's intelligence. If worthy of the name, it works powerfully on his feelings, and through them upon his will. The moral instructor should ever be on his guard lest he fail to reach the moral consciousness as a whole, to quicken feeling and the aspiration which grows out of feeling. In the moral part of education, at any rate, he will do well to keep before him the truth that feelings are "les forces vivantes de l'âme,"[1] and even the half-truth that "the ennobling difference between one man and another . . . is precisely in this, that one feels more than another".[2]

Since the education of a child's moral sentiment is carried out to an important extent in the free play of the children's own social life, the teacher should seek to develop the social life outside the class-room, to encourage boys to join in games, and to work against any tendencies to an unsociable aloofness of attitude. The playground is an excellent exercise ground for some of the rougher yet exceedingly valuable qualities, such as courage, endurance, submission to a common rule, and self-effacement for the sake of a common cause. At its best, the influence of the whole social life of the school on moral development is a profound and many-sided one. In order that it may become so the school community needs to be carefully organised throughout for this purpose. This means not only that the discipline carried out by the authorities, both within and without the class-room, should clearly show itself to be a moral discipline, but that the common ideas, opinions, and feelings of the scholars, as these freely express themselves in the playground, should develop along healthy and moral lines. The action of authority on this "public opinion" and "tone" must in the main be indirect, for to seek to control them directly

[1] Madame Necker de Saussure, *L'Education Progressive*, i., p. 103.
[2] Ruskin, *Sesame and Lilies* (Fourth Edition, 1867), p. 59.

would be to rob them of much of their educative value. That is to say, it must consist in bringing to bear on the social atmosphere the full influence of the teacher's personality, of his chosen principles, his special approvals and disapprovals.

Not the least valuable part of this action of the teacher on the young community is the restraining of the turbulence and excessive pressure of numbers. All crowds are, as such, impulsive, unreflective and even irrational; liable to go wildly wrong through the mere contagion of numbers. The childish crowd is no exception to the rule. The feeling of the playground, even when morally healthy, is apt to be enforced with excessive emphasis. Full moral experience requires a measure of individual liberty, and the master of a school will do well to see that this is secured. He will remember, too, that the young crowd is by no means always right in its opinions and sentiments, that the collective will of the playground may become tyrannical, and that what is morally good, and might after calm examination be seen to be so, may easily be stamped out by the masterful pressure of numbers.

PART IV.

DEVELOPMENT OF WILL AND CHARACTER.

CHAPTER XVIII.

THE CONATIVE FUNCTION: DEVELOPMENT OF VOLUNTARY MOVEMENT.

We may now proceed to consider the third phase of the mental life, the conative or striving function. This has been touched on above (see especially chapters iii. and vi.). It remains to examine the type of process more closely, to trace the course of its development, and to bring out more fully the connection between it and the two phases already considered.

Definition of Conation. The term conation has already been defined as marking off the more active phase of our experience, the process of striving which, in its more developed form, becomes the pursuit of an end. This active process is a fundamentally distinct mode of experience, just like feeling and intellectual process. It cannot be resolved into these, or regarded as their effect. It exists and manifests itself from the first as clearly as pain and pleasure. Nevertheless, as already suggested in dealing with pleasure and pain, and later with the emotions, conation is closely connected with, and its development broadly conditioned by, processes of feeling; and its higher form as the pursuit of an end is no less clearly dependent on the emergence of intellectual processes, ideation and the associative connection of ideas.

As we have seen, conation is specially related to motor activity. To strive is to try to do something in order to attain or realise the object of our desire; and to do something always means to carry out certain movements, *e.g.*, going into a room, writing a letter.[1] These movements, moreover, are objects of perception for others. It follows that in studying the early stages of conative development, in which we are restricted to the indirect mode of studying mind (see p. 4), we must proceed by tracing the gradual unfolding of voluntary movement, from its early impulsive forms,[2] in which there is but little consciousness, up to the later and more mature forms in which there is the full consciousness of deliberate volition.

Kinds of Early Movement. A very young child can perform a large number of movements, which may, broadly speaking, be divided into three classes. These as already stated are, Impulsive, Reflex, and Instinctive Movements (see p. 111).

Both Reflex and Instinctive movements are distinguished from impulsive movements by their greater definiteness and precision. This definiteness is accounted for by the fact that they are carried out by means of special nerve-paths, congenitally-determined sensori-motor arcs which have been perfected and handed on in the course of the evolution of the race. Some of these movements require no practice to adapt them to their purpose, but are fully serviceable on the first occasion on which they are used. For example, the new-born chick can peck at its food with astonishing accuracy of adjustment.[3] Such are called *Perfect Reflexes* or *Perfect Instinctive Movements*. Those which only become fully adapted to their purpose after practice are called *Imperfect*. A perfect movement is one which is incapable of further adaptation. Most reflexes are such; they have reached a maximum of adapta-

[1] Such movements are, as we have seen, involved in attention.

[2] The student should carefully distinguish the two meanings of "impulsive movement," the wider one just illustrated, and the narrower one to be spoken of in the next paragraph.

[3] See Lloyd Morgan, *Habit and Instinct*, p. 41.

tion. Their machine-like perfection, which is the chief cause of their attraction to the physiologist, makes them of little interest to the psychologist. His interest is mainly in those movements which the experience of the individual can modify and render suitable for his own particular life.[1] To such movements we must look for the genesis of volition.

Recent psychologists, *e.g.*, Professor James, have laid emphasis on the number of instinctive tendencies in man including, among others, rivalry, pugnacity, the hunting instinct, and acquisitiveness.[2] It is evident that each of these instinctive tendencies may give rise to a variety of movements, and further that they need to be directed and specialised into definite forms of movement by special circumstances, that is by means of experience (*cf.* above, p. 116, Note C). It is probable, too, that most if not all, instinctive movements, properly so called, are to some extent modifiable by experience.

A further point to be noticed in these primitive movements is that instinctive movements involve an element of feeling. A child carries out the movements of sucking under the stimulus of hunger, and a hen is emotionally excited when sitting on her eggs. This point will be dealt with more fully later.

Feeling and Conation. In instinctive movement, then, we meet with a conjunction of feeling and conative tendency. The close connection between the two, has, moreover, been touched on in earlier chapters, in dealing with attention (pp. 132, 133), with pleasure and pain (p. 367), and with emotion (p. 379). It remains to bring out the relation of the two more fully.

To begin with, conative tendency shows itself as a primitive, congenitally determined variety of mental process. In the early movements just spoken of we see it involved as a tendency to movement. In the case of instinctive movements, at any rate, we may assume that this tendency implies some dim consciousness which grows

[1] *Cf.* Angell, *Psychology*, pp. 63-66.
[2] See W. James, *Principles of Psychology*, ii., chap. xxiv.

more distinct when the movement cannot at the moment be realised. What the precise character of this consciousness may be, we can only conjecture by help of our later experiences. We may suppose it to be a vague state of uneasiness involving a "felt tendency" or *impulse* to move or do something, such as we experience, say, when half asleep we have a dull sense of stiffness or cramp in a limb, and, without any definite aim, find ourselves moving the limb (or the whole body). This vague impulse will grow fuller and clearer through the motor experiences arising from the repeated execution of the particular movement or movements, "traces" of which, together with their effects, will become complicated with, and modify, the impulse.

Yet while we thus recognise conation as an original constituent of our mental life, we must not think of it as wholly independent of other constituents. It begins from the first to have its form and its direction determined by *feeling*. This is seen in the interesting fact that it has two opposed directions corresponding to the affective contrast, pleasure-pain, namely, impulse *towards* what is pleasant, answering to the later state of desire, and impulse *away from*, or aversion to, what is unpleasant. Now this modifying influence of feeling is at work in the earliest stages of conative development. Take appetite for example. There is, of course, a powerful instinctive factor in this case, a look, at least, of tense striving accompanied by violent motor agitation. Yet the state of hunger includes also a highly disagreeable sensation; and we may be sure that even in the first weeks of life the state of hunger will begin to be complicated with a vaguely conscious process of aversion to this painful state.

Let us now take from the first years an experience of pure painful feeling not congenitally connected with any distinct form of movement—say, a sudden chilliness, or other disagreeable kind of organic sensation. The organic connection between feeling and conation is clearly shown

here by the variety of ill-defined motor activity of limbs—together, perhaps, with the vocal apparatus—forthcoming. All unpleasant feeling, when it does not amount to a crushing volume of pain, tends to stir motor activity, which we may fairly interpret as involving a vague form of the impulse to get away from pain.

The case of a present pleasant feeling is somewhat different. When pleased, so far from being discontented and restless, we are content, giving ourselves up to the enjoyment. When luxuriating in a warm bath our consciousness seems to be reduced to just a big sense of massive, undifferentiated, and unlocalised, bodily comfort, in which there is no trace of conative activity. Yet though apparently passive, we may by watching ourselves catch now and then a glimpse of a tendency to persist in the state, as when we wonder how many minutes we can prolong the pleasure with safety to health. Any suggestion of an interruption of the sensuous bliss would, moreover, be fiercely resented. Here then, too, is a trace of conation, quiet but on the watch. The immediate emergence in a state of enjoyment of an impulse to prolong the experience is much more clearly illustrated in the case of a child who wants to continue the delight of a game or of a story when bed-time comes.

While thus organically connected, however, feeling and conation can be seen to preserve their distinctness, and a certain measure of independence. Similar conditions of feeling are not always accompanied by similar *amounts* of motor activity and impulsive striving. Weariness, sickness or a "slack" mood may lower conative energy, so that pleasure and pain, though still felt, no longer prompt to their respective modes of activity. Toothache may master us so completely as to stifle even the impulse to groan.

Within the first three years of child-life, too, we may find illustrations of pleasant and unpleasant experiences being recalled and assuming the form of possible *future* experiences to be realised or shunned. This intrusion of feeling appears quite clearly in cases where a powerful

congenital impulse, is provided, as in appetite. Young children when hungry are not merely subjects of à powerful conative tendency and bent on satisfying this, but begin to represent more or less distinctly the pleasures of the table. Even a dog has passed into this stage when under training he accommodates his behaviour to the conditions of new enjoyments, such as a morsel of sugar or biscuit. And in the case of child and dog alike painful experiences are recalled with sufficient distinctness to serve as primitive deterrents. This subjection of conation to our great masters, pleasure and pain, grows wider and wider with the years, so that the primitive conative tendencies are apt to be partially veiled. Yet these last not only persist but have a considerable range of activity; and, as we shall see, become later on reinforced by the secondary quasi-instinctive tendencies begotten of Habit.

According to this view, then, conative processes have two sources or modes of origin: (*a*) congenitally determined tendencies to follow out particular lines of activity or attain particular objects—*e.g.*, walking, climbing, striking when angry, exploring with eyes and hands, collecting things—quite irrespectively of pleasure and pain, and (*b*) tendencies developed by experience to seek this and that experience *as pleasant*, and to avoid this and that experience as unpleasant. The second, which may be called hedonic tendencies, presuppose, of course, a certain congenitally determined general disposition to get away from or end what is unpleasant and to hold on to or reach what is pleasant, which disposition ought, perhaps, to be regarded as the most comprehensive of the instincts.

It may be added that since, as we have seen, conative activity has its own characteristic pleasantness (as well as unpleasantness), motor activity, especially in the early years, is frequently sustained by its inherent pleasantness. This is illustrated in much of the spontaneous activity of a healthy and vigorous child, the running, shouting, and the rest, though this illustrates, further, the tendency to express a state of feeling, which in this case may include

a flow of "good spirits," and a joyous sense of renewed vigour and power. This is clearly illustrated, too, in play. It is to be noted, however, that the pleasure arising from the activity itself cannot become the primary aim of our action. Even in play we have to set up a sort of fictitious aim, *e.g.*, realising the *rôle* of a soldier, winning a football match, in order to be able to enjoy the activity.

The proportion between the contributions of the two great sources of human action here distinguished varies in the case of different individuals. If, for example, we compare different men's ideas of friendship, we can readily see that there is the blinder and more instinctive, and the more calculating, hedonistic type. One sort of man will seek his friend, much as a dog seeks his master, under the stimulus of a strong gregarious instinct specialised by the circumstances of his life. He is quite happy just to sit quietly at his side. The other kind seeks the society of his friend with a frankly hedonistic purpose—to secure some fresh entertainment, for example, witty talk or humorous stories. (Note A.)

We may now briefly sketch the course of development of conation during the first years. In doing this we shall follow the series of levels, sensory, perceptual, etc., distinguished above.

Sensation and Movement. Besides having quite early a number of congenitally determined movements, children seem to possess a fund of motor energy, the discharge of which causes them the greatest satisfaction. The diffuse movements of a baby's limbs are accompanied by coos and smiles which indicate pleasure. Not only so, he delights in certain forms of sense-stimulation and directs his movements towards prolonging the pleasant excitement. Prof. Stout says: "The primary craving with which the education of the senses begins, so far as it does not involve such special practical needs as that for food, may be described as a general craving for stimulation or excitement".[1] In

[1] *Analytic Psychology*, vol. ii., p. 95.

place of the unrestricted, yet presumably pleasant, impulsive movements, such as kickings and rollings, there gradually appear the modified movements which are fitted to sustain pleasant sensations. A bright colour compels the notice of a baby and calls forth the definite movements fitted to prolong his satisfaction. Thus, he moves his head and eyes to the most favourable position, and may even stretch out his hand or creep towards what attracts him.[1] Fascinated by the object, he modifies instinctive and impulsive movements and welds them into one co-ordinated system which subsequent similar occasions will render more and more perfect.

Pain, as suggested above, is a great means of developing the child's motor responses. In a very young child the movements caused by pain are very diffuse and in extreme cases may end in convulsions. Often, however, some movement may chance to alleviate or remove the pain. The result of this instinctive process of trial and failure persists, and later there is an association between a pain and its palliative or remedial movement. Pain not only modifies movement, but it compels us to discriminate objects in our environment. A child stung by a bee or a nettle is apt to treat a similar object with respect, the association with a painful experience giving a deterrent meaning.

Movement at the Perceptual Level. A further stage is reached when the child has definite perceptions. Many instinctive movements appear first at this level, including those excited in the emotional reactions of anger, fear, etc. At this level, too, there appears a clearer type of hedonically determined movement. As a simple example of this type let us take the picking of a flower. The child recognises the object as a flower, and an agreeable feeling as well as a rudiment of desire for the flower being aroused, he immediately stoops to pluck it. This is an illustration of simple conative impulse, the interesting presentation being

[1] See Miss Shinn, *Notes on the Development of a Child*, p. 14.

immediately followed by the movement. At this stage the child is still largely at the mercy of stimuli coming from the external world. He would most probably let the flower fall if some one offered him a gaily-coloured ball, thereby illustrating that his conative activity is, for the most part, a series of short jerky flights followed by brief halts. It is the novelty of his environment which explains this rapid displacement of old attractions by new.

A second stage may be noted when the picking of a flower leads to a *series* of movements involving conative *continuity*. The child not only obtains the flower but he shows an intelligent, continuous interest in it—sticks it in a buttonhole, smells it, and so on. Just as before, the movement is occasioned by a perception of the flower, with the difference that the possession of it leads to its examination and retention. Conation begins as an impulse but is sustained by continued interest; the initial objectively-determined attention passes into subjectively-determined attention, and conation becomes continuous. The activity involved is intermediate between a mere conative impulse and a full explicit desire. In the earliest years the germ of volition shows itself in persistency, including a certain obstinacy in motor activity. But that form of persistency which shows itself as a series of movements directed to a particular end, marks a higher stage of conative development. Because of this element of persistence or continuity our second class of perceptual movements may be termed quasi-voluntary.

A still further advance may be noted when the child goes so far as to run home with the flower and show it to his mother. The series is initiated, as in the former cases, by a percept, but now the percept calls up the *idea* of showing the flower to his mother and sharing his delight with her. In such actions we find the beginning of desire, that imperfect form of it which, since it is initiated by percepts, may be called *Perception-prompted Desire*.

Effects of Experience. Many of the early movements of children are diffused, and much energy is wasted, owing

to lack of precision. How does this diffuse movement or "over-production" become restricted? Some interesting experiments made by Prof. Thorndike illustrate the process.[1] He confined some hungry cats in cages, which were so devised, that by moving a catch on the door of the cage the animal could escape and obtain some fish that was placed outside in full view of the imprisoned animal. The sight of the food caused the cat to make a series of random clawings and scratchings, until at last some lucky movement chanced to hit the catch and open the door. This experiment was repeated many times with the same animal, the object being to determine the effect of repetition; and it was found that the time taken to escape gradually diminished, until at last the animal freed itself at once[2] (Note B).

A similar process of trial with gradual elimination of error may be seen in a young child who reaches for a ball: at first his movements are wide of the mark, but with persistent effort the random movements become more and more restricted, approximating to the precise form required, till he gains possession of the coveted object.[3] The pleasure of possession thereupon causes the conative impulse to cease, or redirects it into other channels. At the same time it helps to fix in the memory the means of attainment, so that, although if the child drops the ball he will probably not be able to regain it at once, yet in his next attempt there will be noticed a certain growth of facility and an approximation towards precision.

The movements thus acquired are the basis for future similar operations, becoming modified by suitable slight alterations which the foregoing process of "trial and error" determines and fixes. This has been called "motor apperception"—the old movement being utilised in acquiring

[1] See Monograph Supplement No. 8, *Psychological Review*, and Stout, *Manual of Psychology*, p. 269.

[2] The student should compare with Thorndike's experiments those of L. T. Hobhouse, *Mind in Evolution*, chaps. vii. and viii.

[3] *Cf.* Angell, *Psychology*, pp. 348 ff.

such movements as are a combination of the old with some novel element (*cf.* p. 261). It is at this period that Imitation and, later, Play begin to be potent factors in the development of movement.

As pointed out above (see p. 32), control is acquired first over co-ordinated movements involving muscles near the trunk (*e.g.*, the muscles of the shoulders or of the thighs) and only later over those involving muscles nearer the extremities of the limbs (*e.g.*, those of the fingers). But this generalisation holds good only of the development of movements carried out under the intelligent control of the subject, and not of spinal reflexes.[1] The reason for this is that in the case of the spinal, or first level, arcs we must suppose connections, even of considerable complexity, to be complete at birth, so that we cannot speak of their development at all from the point of view of the individual, but only from that of the race.

Throughout this gradual advance the child shows a tendency to select the useful, that is the beneficial, movement from the field of non-voluntary movement. We are so constituted that we strive to escape from pain and to hold fast to pleasure, and this is the principle that causes persistency or cessation and redirection of effort.

Ideo-Motor Action. It has been experimentally shown that when a person shuts his eyes, and thinks of some object, say a bookcase on his right, his body makes a slight movement in that direction. Common experience supplies similar examples. Thus, the thought-reader depends upon the interpretation of slight movements made in answer to suggestions; and at critical junctures in a football match many of the spectators kick, oblivious of their neighbours' comfort. Again, when reciting a vivid personal experience we are apt to repeat at least some of the movements of the original occurrence. From evidence such as this it is concluded that motor images or ideas tend of them-

[1] Hence Prof Thorndike's objection, that the curling of the toes and grasping of the fingers appear among the infant's first reactions, does not seem to be well founded (*Notes on Child Study*, p. 111).

selves to pass into movement. The nervous energy which is involved in the reinstatement of the idea tends to pass over into the associated motor tracts, and so to produce movement. Such involuntary movements are called *Ideo-Motor Actions*. Whenever ideas of movement fail to pass into action it is because we inhibit the motor impulse or the incipient movement.[1]

It is to be noted that the motor image in this case may be of the most shadowy and fleeting character. Where there is no impediment, and the movement can be carried out immediately, the rudiment of motor image becomes submerged in the fuller and more vivid experience of the kinæsthetic sensations arising from the movement itself. Hence the difficulty of analysing it out as a separate stage afterwards.[2]

In children, as well as in savages, the tendency for motor ideas to act themselves out is very great, as we may see in the frequency with which they talk to themselves and dramatise their ordinary conversation. When children have few ideas, *i.e.*, when they are just advancing to the ideational level, much of their action seems to be of this kind. The very paucity of ideas favours this, for there are no competing ideas to induce inhibition and present material for choice. At this time action has a jerkiness comparable with that noted at the early perceptual level. "No sooner imagined than done" is the rule in such cases. The child jumping up from his unfinished meal is not mad: he is merely obsessed by an idea. Spontaneously recurring ideas are a familiar source of inattention and fidgetiness. As a compensation, the teacher may remember that he has only to suggest a line of action in such a way as to produce a vivid idea of it, in order to ensure its performance.

Imitation. The term imitation refers primarily to the

[1] *Cf.* Stout, *Manual*, pp. 485, 486.

[2] There is a certain analogy between this submergence of the motor image and that of rudimentary image in the intenser sensuous experience in many cases of perceptual recognition.

copying of another's movements. An imitative movement is one which is called forth by the presentation of a like movement carried out by another: a young child laughs when he sees or hears his nurse laugh; and later, he tries to crack a whip in the way he has seen his elder brother do. Imitative movements may be divided into two classes —the *Spontaneous* and the *Deliberate* or purposive, and these, broadly speaking, answer respectively to the perceptual level and the ideational level. By such imitative movements animals and young children greatly extend the range and variety of their movements and at the same time acquire those reactions to their social environment which experience has shown to be most serviceable.

Spontaneous Imitation. The imitative movements of young children are largely of the first kind: the mere sight or sound suffices to call forth an imitative response. The pet monkey that tried to shave himself as he had seen his master do, and the child who appropriated his father's pipe, paper, and easy chair and occasionally rose to knock imaginary ashes out of the pipe, are so far at the same level of intelligence. In each case there is a complete absence of any idea of a definite end or purpose; the monkey had not the slightest wish to improve his personal appearance and the child was guiltless of any intention to be "a little man". He was just impelled to act in the way another person had acted.

The question whether imitation is instinctive has been answered in different ways. It is certainly instinctive in the sense that when the required associations and the corresponding nervous connections have been formed between the visual (or auditory) and the motor centre there is a tendency to respond imitatively to the lead of another's movement. It is to be remembered, too, that the action imitated is frequently backed up by an instinctive tendency, and becomes "interesting when another performs it, so that the imitative impulse comes into play".[1] Imitation

[1] Stout in *Manual*, p. 283.

thus both calls certain instinctive motor tendencies into activity and greatly aids others to develop.

Spontaneous imitative movements occur very early in the life of the child. According to Darwin and Preyer, pursing of the mouth or pouting begins at the age of four months. It is not, however, till towards the last quarter of the first year that mimetic movements become well marked and frequent. From this time onwards children will copy gestures, *e.g.*, the "good-bye" movement of the hand, and any other movements which produce a lively effect, such as rattling a bunch of keys. In the second year imitation of vocal sounds plays a more prominent part in child life. Other interesting imitations observable in the second and third years are the copying of the manual movements of older persons in writing, drawing and so forth. Imitation is limited on both the motor and the sensory side by the operation of the law of apperception. The new action must combine a certain amount of familiarity with its novelty: the sight of a ball being tossed by another interests a child only so far as it connects with his previous experience—tossing or similar movements; and the movements required for catching a ball are only possible when many motor adjustments of arms and trunk have already been carried out.

The second phase of imitation appears when the child begins to act with less of machine-like regularity. Thus, he may accidentally knock a spoon on a plate, with the result that the sound gives rise to a shock of pleasant surprise which is shown by the facial expression. Presently he desires a repetition of the experience and performs the movements again and again until he loses interest in the proceeding. This has been called *self-imitation*, and it illustrates the idea of an organic circuit spoken of above (see p. 121). But he may vary the procedure by knocking any other piece of glass or crockery within his reach; in which case self-imitation shades into *Experimenting*. With the growth of free ideas comes *Reminiscent Imitation*—a rehearsal of what has been seen or heard previously

—and, later still, *Deliberate Imitation*, a higher process to which we shall return in the next chapter.

Imitation and Opposition. Imitation is a potent factor in human development. Its significance lies in the fact that it vastly enlarges the field of motor activity. It is an easy means of reaching new, and enlarging and perfecting old, motor attainments. The imitative impulse, strong in certain animals, is universal in the case of man. The Cape Town Kaffir dons a top hat, sports a brass watch-chain and swings a walking-stick; the æsthetic lady professes to enjoy her Browning; fashions wax and wane; crowds act in concert, and panics on the money-market spread—simply because man is a gregarious animal and is influenced by the actions of his kind.

We are, however, saved from the horror of uniformity of behaviour which the imitative impulse left to itself would introduce; for there is doubtless an impulse to *oppose*, which is as fundamental as that to imitate, and which limits and modifies its action. We show not only originality in selecting what we imitate, but also "the love for contrasting one's self with one's fellows in behaviour, in opinion, or in power".[1] The proportion in which these two contrasted tendencies, imitation and opposition, are present forms one of the chief elements in temperament, the person with strong initiative having more, and the docile individual less, of the developed instinct of opposition. The highest type of character is that in which there is a fine blend of both. Other conditions modify the force of imitation. Firstly, many actions cannot be completely imitated: thus no amount of practice would make a Blondin or a Garrick. Secondly, in many cases before perfect imitation is reached, the desire for complete excellence has vanished: we can perform the action sufficiently well for our purpose and further effort is useless. Thirdly, a chance variation of the imitative attempt may give pleasure and lead to a new type of action. Thus a boy imitating

[1] Prof. Royce, *Outlines of Psychology*, p. 227; *cf.*, Prof. Lloyd Morgan, *Psychology for Teachers*, chap. vi.

another's whistling may strike a new and more pleasing note, and, experiencing the thrill of origination, may modify his former purpose.

The value of the impulses of imitation and opposition to the educator can hardly be exaggerated. With regard to imitation, an appeal to this impulse in the case of children, as in that of the higher animals, is often the best, and sometimes our sole, means of instruction. One does not verbally explain to a dog or an infant how to pick up the newspaper. The seeing of a pair of compasses or a needle used by a teacher, or the hearing of the pronunciation of a foreign word, is more effective than the reading of pages of instructions about such matters. There are, however, two cautions necessary here: (1) We should see that the movement required is well within the power of the scholar. Thus in physical exercises we should observe a proper gradation and sequence, gradually building up, in accordance with the principle of apperception, from the simple movements common to young children. (2) We must be careful to exhibit a good model, for children imitate the bad as easily as the good. The teacher has to watch his own behaviour, the forms of language he uses and so forth, just because his pupils are disposed to copy him in everything.

From the directions of imitation the teacher may often divine the interests of the child. We may not be able to predict that a child who is continually imitating a carpenter will become a fine cabinet-maker; but we can take the fact into consideration in educating him, making use of the "natural reaction" as a sign that the time has arrived for some particular line of development, say that of a manual training workshop.

As a source of stimulus, imitation is invaluable: he was a shrewd boy who placed an ostrich egg in front of his bantam together with the inscription "Keep your eye on this and do better!" A teacher who is keen to produce good drawing will do well to select the best drawing in the class, and, after a few judicious remarks, to pin it up in a conspicuous place; and, further, to allow the backward scholars

to see the better ones at work. If he cares for experiment he may tabulate the marks; recording the progress, and comparing the results, of good teaching, first without, and then with, imitation and its accompanying spirit of emulation.

In the field of manual dexterities and in that of accomplishments, such as drawing, imitation passes rapidly into emulation and almost always makes for progress. It is obvious that, as a moral force, imitation may produce either good or bad results. Special consideration is needed in dealing with well-meant attempts to imitate older people, even in so awkward a case as that of the little girl who tried to make herself useful by painting the dining-room chairs with the colours of her new paint-box. The good intention which prompts such actions is valuable, and therefore correction must be made in the kindliest and most tactful way. It is well, further, to make allowance for children's strong imitative impulses in dealing with their faults, *e.g.*, by punishing with special severity the *ring-leader* in concerted acts of disobedience.

On the other hand, the educator has to seek to check the excesses of imitation, to teach the boy to think and to act for himself. In the effort to develop this more independent kind of activity he will find, as will be shown in chapter xvi., that the impulses of opposition will stand him in good stead.

Play: Theories of Play. Like imitation, Play has its roots in instinct: the kitten chasing fallen leaves, or pouncing on a rolling ball, is obeying an instinctive impulse. There are two chief theories of play.

(*a*) **The Surplus Energy Theory.** According to this, play is the result of discharges of accumulated motor energy: the motor nerve-centres being surcharged with energy, the animal's playful movements are the means by which this pent-up force is expended. In other words, play is a systematised form of impulsive movement. In support of this view it is pointed out that animals and children are restless and playful after sleep and food, *e.g.*, in the morn-

ing, and that play occurs chiefly in the early years of life, disappearing gradually with advancing age.

(*b*) **The Adaptation Theory.** With the spread of the theory of evolution a second view has arisen. Play is regarded as having a meaning in the development of the higher animals. Playful actions are a rehearsal of such reactions to environment as will be serviceable, and possibly necessary, to the animal in the adult stage. The kitten that chases and bites a ball of wool is learning the movements by which, later on, it will catch its prey. Some of the supporters of this view lay great stress upon the idea that playful movements recapitulate the stages of evolution: that when, for example, a puppy lies in wait to pounce upon his unwary brother, he is recurring to the movements used by his wild ancestors in getting food.

It is probable that each theory contains a part of the truth. Play, as a form of movement, is no doubt sustained by the impulses to movement growing out of that accumulation of surplus energy which characterises the first years of life. Yet this fact is quite consistent with the view that playful movements will be of future service. Moreover, surplus energy tends to discharge itself along the paths already laid down—the congenital systems—and these have been formed and developed by the evolution of the race, and are so far recapitulatory. But in so far as an animal's environment and needs are similar to those of its ancestors, such recapitulation is itself preparation for future action. The kitten springing upon a moving ball is letting out its stored motor energy through a congenital system of movements which has been perfected by its ancestors; and, in so far as mouse-hunting will be necessary for its future welfare, it is schooling itself for later serviceable action.

From a psychological point of view, play activity is spontaneous in the sense that it is free and uncontrolled, and further, not consciously directed to any useful result. It is largely self-sustaining activity prompted and prolonged by its own pleasurable interest. Play is also

greatly supported by the impulse of imitation. Most of the play which children invent for themselves imitates the actions of older folk, nurse, parents and others, in their real environment, as well as those of the heroes of fiction.[1]

Forms and Periods of Play. In the child play has a quasi-voluntary character. It is modified by that intelligence which is typical of the human species. A kitten at play always keeps within a certain narrow range of movements, but a child will vary his actions day by day. There are two main periods in the development of play in children: that of solitary play, which is noticeable in the earliest years when the child is mainly at the perceptual level, and that of social play, which becomes more and more prominent as he advances to the ideational level. Early forms of play assist the development of imagination and extend the range of movement. Images are made definite by play; and as the ideas become clearer they pass into action; and thus orderly trains of ideas correlated with suitable movements are established. The limits of perception are transcended gradually. At first, the wooden horse is put into a stable, harnessed to a cart, or taken to a field to graze. Later, it is ridden in an imaginary race, and later still, the young hero rides as a prince into deadly danger and performs the doughtiest deeds. The horse has, at this stage, become a mere cue for the starting of the needed trains of images and ideas.

Games of "make-believe" often require the co-operation of others, and it is at this point that social play begins and the time approaches for the child to take part in the games which are so characteristic of the Anglo-Saxon. At least this can be said for our national games, that by means of them a boy gets experience of corporate life which will be useful to him all his days. The subordination of self to the welfare of the team or club, the ready and willing obedience to superiors, the co-operation for a common end,

[1] On the different theories of Play see the works of Karl Groos, *The Play of Animals*, and *The Play of Man*, together with the Prefaces by J. Mark Baldwin.

and the sense that the eyes of the world are upon him, provide no unworthy preparation for later social conduct. On these grounds organised games should be included as a part of school education. So, too, should the play which is obviously a preparation for future life. A doll's tea-party is a fine opportunity for teaching how to set a table, to handle crockery, and to behave suitably. Yet the employment of it by the teacher requires no little tact in order to secure for the players that sense of freedom and abandonment which is the essence of play. The formal physical exercises of the gymnasium are good, but they cannot be compared with the self-directed activities of the playground with their heightened pleasurable consciousness.

Verbal Suggestion of Movement. Another form of early movement having something of the ideo-motor character is action excited by verbal suggestion. We sometimes catch ourselves moving the arm in listening to a vivid description of a fight. Such an action is non-voluntary, like an imitative one, to which, indeed, it is akin. No desire, no idea of an end to be realised takes part in this case, the process is simply the calling up of motor ideas in a particularly energetic form. Personal "suggestion" consists largely in the setting up in the subject's drowsy mind of this and that motor idea which instantly act themselves out. Even the effective form of a command, say the "Attention!" or "March!" of a drill-master, owes something to this tendency of strongly excited motor ideas to realise themselves as full motor experiences. The boys in a drilling class, in taking up their initial attitude of quiet attention, are no doubt carrying out a true voluntary action; but in most of their swift motor responses to orders they are just "letting themselves go," that is to say, allowing the suggested motor ideas to produce their natural effects.

Desire and Volition. When a hungry child sees his bottle he at once strives towards it. After a time he will cry for it, and reject other objects as failing to satisfy his longing, while he will greedily stretch out his hands

when the familiar bottle appears. He is now attaining the ideational level of free ideas. At this level *Desire*, in the fuller and explicit sense of the word, begins; and here, too, we find the beginning of that higher form of conation which is called *Volition* or *internally* initiated striving towards a conscious end.

Let us analyse a case of simple volition. Suppose a child is sitting in a room and suddenly wishes to go out to play. The wish grows more intense as the idea of the play grows fuller, enriched by memories of past experience. The desire for the play tends to call up images of movements to be carried out, *e.g.*, of fetching the hoop from the cupboard; and when this process of motor representation, sustained by the desire, becomes sufficiently vigorous, it will, provided that nothing interferes with the wish, work itself out into action. The great difference between this type of movement and the ideo-motor type described above is the intervention of a stage of full explicit desire, of a state of active tension involving a feeling of dissatisfaction with the actual situation and a longing for an ideal situation. Desire is an essential factor in a truly volitional process.

Yet desire by itself is not enough for the whole of this simple volitional process. A child is apt to desire many fanciful things; but since no ideas of suitable actions for realising these occur to his mind, the desires remain mere fruitless wishes. Again, although the desire may be for something which is attainable, yet the conditions of attainment may not be realised at the moment, as when a child desires his dinner an hour before the proper dinner-hour. In such cases, if the state of desire persists, he active tension grows markedly painful and dominates consciousness. This may be called Obstructed Desire.[1] Much mental energy gets wasted on such fruitless unrealisable desires.

A volitional process consists, then, of (1) a desire for

[1] See article "Psychology" in the *Encyclop. Britannica*, p. 74. Prof. Ward limits the term "desire" to what we have called "Obstructed Desire".

something, (2) an idea of suitable action or means of realising the desire—the two having become closely connected and acquired a certain persistence and force. Whether more than this is involved in this simple type of volition, namely, a consciousness of self as agent and a "fiat" of will, is exceedingly doubtful.

Aversion is the negative aspect of desire. It is a tendency away from a certain situation which is in itself painful. Familiar examples are the fact that sitting in an uncomfortable chair sooner or later leads to movement, and that the disobedient boy shrinks from an interview with the headmaster. In aversion the painful element lies in the actual or anticipated experience, not in the thwarting or delaying of the fruition of an ideal or imagined experience as in the case of desire.[1]

With the growth of imagination more complex desires arise. The child, fascinated by phases of experience stored up in his memory, plays many parts. His early desires are apt to be capricious and fleeting. But later, as ideal construction of the self progresses, the emergence of persistent desires may be noted. Because he has resolved to be an engineer, the boy begins to take seriously to the mathematics, with which hitherto he has but played. Later this may become the purpose of his life, a dominant desire, colouring the whole of his experience.

The insatiability of human desire is proverbial. For man present experience is but rarely satisfying:—

> We look before and after
> And pine for what is not.

On the other hand, among animals desires are probably rudimentary only, and confined to a few higher species. In their case action—other than that prompted by appetite and instinct—is largely the outcome of simple impulse in response to sense-stimuli.

[1] Whether the state of desire when realisation is not greatly retarded is painful, is doubtful. A boy may be said to enjoy desiring a well-assured dinner.

Attention and Voluntary Movement. As has been implied in this account of voluntary movement, selective attention is an essential part of the process.

It may be added that attention to the motor idea in the volitional process is in general occasional and slight. Even in learning a new movement we attend mostly to the end to be reached, the motor idea being relatively vague and semi-conscious. When, moreover, the movement to be carried out is a familiar one, there seems to be no distinct stage of motor representation. It tends to be slurred over, becoming submerged in the immediately succeeding stage of motor experience—that of motor sensations.

The actual carrying out of a voluntary movement includes a physiological process—the innervation of a certain group of muscles—to which, as is now commonly supposed, there corresponds no mode of consciousness (*cf.* p. 116, Note B). Yet we are conscious of our movements because of the kinæsthetic sensations to which they give rise. It is this new experience which is the base of our consciousness of activity, or of being agents. When viewed in relation to this consciously realised action the desire is spoken of as the cause or *motive;* and the result, so far as represented and aimed at, as the *end.*[1]

We will now trace out the further development of the process involved in voluntary movement. At the present stage we shall be mainly concerned with the gradual extension and mastery of the field of movement. The growth of the initial element of desire or motive will be traced out in the following chapter.

Motor Improvement. The process of trial and error may be described as nature's method of education. The way, however, is often long and painful, and it is for the educator to make the rough path smooth. The drill lesson may serve as an example of the process of learning movement in the shortest and best way. The teaching of

[1] The word "end" (Greek τέλος) means here not merely that which comes last in order of time, but that, the idea of which determines the movement and makes it an intelligent action.

a new exercise involves, (*a*) the showing of a pattern, by which the child gets a series of visual impressions; (*b*) the imitation of the movement, which yields kinæsthetic sensations corresponding to, and associated with, the visual impressions; (*c*) the more intimate combination of (*a*) and (*b*); (*d*) increased control of the kinæsthetic series and inhibition of mal-adjustments so that the word of command supersedes the pattern; and (*e*) practice, which gives smoothness and regularity.

Certain rules of practice should be observed. It is found that short practice periods, separated by moderate intervals, are best, giving fewer mal-adjustments and more certain progress in smoothness and rapidity. The practice periods must not, however, be too short, for then the pupil does not reach the end of the "warming-up" period, after which the most rapid progress is made (*cf.* p. 39). All practice during fatigue is injurious and hinders progress, causing increase in mal-adjustment and often distaste for the exercise. Rapidity of movement is of secondary importance; only when the details of execution are perfect should increase of speed be aimed at. "Form first, speed next," should be the rule. Rhythm is not only an important aid in securing regularity and precision, but it is in itself pleasant and encouraging, and reduces fatigue. This is illustrated in one of the latest methods of teaching the elements of writing by introducing the metronome. By this device continuous lines of pothooks and hangers, etc., are made, each unit being executed to a beat of the metronome.

In all learning there is a stage of little or no conscious progress, during which we are apt to exhibit poor form and to be disappointed with our results. At this stage the curve of improvement shows a horizontal or even slightly downward direction, this part of the curve being called the Plateau.[1] This is followed by a rise which indicates a period of sudden and rapid improvement during

[1] See Bryan and Harter, *Psychological Review*, vol. vi., p. 346.

which we acquire the knack.[1] This is a striking example of scientific investigation corroborating common experience. As all cyclists know, facility in riding a bicycle comes at a burst. In the learning of a new subject a period of discouragement is followed by sudden illumination and understanding. R. L. Stevenson declared that some of his finest work was elaborated in sleep. To the same class, perhaps, belongs the phenomenon known as getting "second wind". In these cases we have to suppose that there is carried out some "psycho-physical" process of adjustment, of the nature of which we know at present very little. Teachers must treat the plateau period optimistically by regarding it as the forerunner of sudden attainment.

Experimental evidence has shown that easy well-graded exercises are best. Thus, in using dumb-bells the greatest proficiency is obtained by beginning with light weights and proceeding by slight increases. As a last point we may mention that in all drill there should be some preadjustment of attention to the movement in order to secure a maximum benefit. This preadjustment will involve a more or less distinct image of the kind of movement to be carried out. Yet this preadjustment should involve as little as possible of effort, which is distinctly unfavourable, since it tends to distract attention by introducing an element of self-consciousness.

Progress in gaining command of the organs of movement depends very much on the adaptiveness, or what Prof. Royce calls "docility," shown by the child in readjusting past motor experiences to new circumstances and aims. Throughout this progressive extension of the range of movement there is a double process of isolation and combination of elements. The carrying out of a voluntary movement implies the inhibition of any other motor tendencies active at the time. The learning of even so simple-looking a movement as pointing with the forefinger implies a somewhat difficult process of isolating

[1] See Judd, *Genetic Psychology for Teachers*, p. 248, and Bryan and Harter, *loc. cit.*

the extension of the finger from that of the other fingers. We see the same thing in later acquisitions. In learning to write, a child has to check a tendency to other concomitant movements, such as those of the head, legs and tongue.

Not only so, in learning new complex movements useless motor concomitants and old associations of motor elements have to be broken through. Many manual movements involve a dissolution of previous customary combinations, as is illustrated in the new co-ordination of fingers and hands needed for piano-playing, typewriting, etc.

All progress in new movement involves the ability to put together motor elements in new combinations, that is, to *construct* new movements. Such simple actions as carrying an object to the mouth are acquired by combining the grasping or holding movement of the fingers with the carrying movement of the arm. Similarly, in learning the later movements of writing, a child has to hold the pen in a certain way, and to combine a relatively fixed position of the fingers with the necessary movements of arm, hand and fingers.[1] All new exercises, such as those of school-drill, of skating, bicycling, imply a like constructive activity (compare above, pp. 261 f.).

Further Developments of Voluntary Movement. The voluntary movements thus acquired undergo certain changes as the result of development. A word or two may suffice to indicate the general characteristics of this progress.

As has been sufficiently illustrated, movement becomes, with advancing development, less an immediate response to the sense-presentation of the moment, less like a reflex action in its form. By this is meant that it takes on more of the look of an action initiated by internal forces. This accords with the general order of mental development, from external sense to internal processes of imagina-

[1] See Judd, *Genetic Psychology for Teachers*, chap. vi.

tion and thought (see above, p. 65). This substitution of an internal for an external or sensuous mode of initiation involves the storing of the mind with images of objects of desire and of suitable actions.

One characteristic of this motor development requires to be especially emphasised. In the early stages motor images play an important part. It is, of course, difficult for the adult, most of whose movements have grown easy and semi-mechanical by many repetitions, to detect this motor image in his own experience. Yet any one who can clearly recall the experience of learning to get the feet on to the pedals of a bicycle after mounting will know how in an early stage of the accomplishment pretty distinct images of the required movements appear.[1] In certain cases the motor representation is much less marked. This applies to learning to write or draw *from a copy*. In these cases, as we know, the attention is fixed on the visual form before the eye, and the movements seem to take care of themselves. Yet it is necessary, in order to understand how the movement should get initiated at all, to assume a momentary stage of motor imagination. Repetition and practice, by diminishing the intensity of the whole conscious process, appears to reduce the dimensions of this motor image to the vanishing-point. We see or imagine, say, a line, and straightway draw it (Note C).

The progress made in the several stages of this acquisition of the command of the organs of movement will vary with the active disposition of the child, and with the character of his surroundings. Confining our attention for the present to the internal conditions, we may instance these as among the more important: (*a*) we have to assume a special motor disposition—something of the "motor" type, as it has been called, with its readiness to react promptly and vigorously on sensory stimuli. Along

[1] The advantage of this illustration is that it refers to a movement which cannot be seen, but only "felt". In my own case definite motor images became prominent in a second stage after one of more or less random "feeling about" for the pedals.

with this are required (*b*) delicacy of the muscular sense, which favours a fine discrimination of motor presentations and representations, and so a nice execution of the several movements; and (*c*) closely connected with the foregoing, a high retentiveness for motor presentations, which favours the association of them with the sense-impressions which evoke them, as also with one another in groups, and so secures their orderly reproduction. It may be added that this natural basis will pretty certainly develop a keen interest in muscular activity and its effects, which interest will lead to the habitual direction of attention to motor experiences.

The attainment of a large and firm command of the bodily organs is an important preliminary to the growth of the higher volitional processes. All our actions, even the lofty moral action of a hero, are carried out by means of movements of various kinds. Not only so, the very process of acquiring this command of movement implies, in a rudimentary form, the higher volitional qualities, and more particularly persistence in effort and trial, resolution in overcoming difficulties, and practical intelligence in comparing and choosing between alternatives. Anybody who watches an infant, even in the first year, trying to combine manual movements, so as to raise or to turn over a heavy and unmanageable object, may see how in this early and crude form of action the attributes of the higher volition begin to manifest themselves.

Movement and Habit. The term Habit may, as we have seen (*cf.* p. 69), be used in a comprehensive sense to connote the effect of *repetition of experience*. In the sphere of thought, of feeling and of conation alike, repetition has its effect, which is felt by us as increased familiarity or facility.

The effect of such repetition is most strikingly illustrated in action. We are said to do a thing under the influence of habit when we carry out a familiar action, in response to some initiating stimulus, with a greatly reduced consciousness. Examples of such habitual actions abound in

daily life, *e.g.*, walking, dressing and writing. All such movements take on something of the mechanical or automatic character of a reflex action, and for this reason they have been called "Secondarily Reflex Actions". They differ from pure reflexes, however, in the fact that they are capable of modification, with greater or less difficulty. Although we usually dress in a particular order, we *can* by an effort of will vary the operation; whereas we might find it almost impossible to alter a trick of manner persisted in from early years.

It has been already shown that every movement tends by repeated performance to grow definitely set and easier, involving less of close attention and conscious effort. On the physiological side we find that the degree of organisation of any neural path increases with the number of repetitions, each successive neural excitation deepening the trace or "physiological disposition" left by previous performances of the movement (*cf.* p. 68). The "psychical disposition" is felt by us as an increased facility of movement and a lessening of conscious effort.

This increased facility in carrying out an oft-repeated action frequently involves a lessening, through a process of accommodation, of disturbing influences on the attention. This is illustrated in our every-day work, in which we get used to, and so neglect, noises, etc., which at the beginning were grievously disturbing. The "capability of accommodation" as measured by the readiness with which this adaptation to distracting noises, etc., is carried out, has been made the special subject of experiment in connection with the investigation of attention.[1]

When the increased facility of a movement due to repetition reaches its maximum, the conscious effort, and even attention, are at their minimum and sometimes seemingly absent. At this stage a barely conscious conative effort suffices to set the movement or series of movements going. After its initiation the whole series works itself out,

[1] See above, p. 143; also Meumann, *op. cit.*, i., pp. 505 ff.

each movement reinstating its successor. A similar phenomenon is experienced in associated series such as those of words. In the repeating of poetry, the first words lead on to the whole series, which proceeds, as it were, by itself. In all such cases the order of reinstatement is that of the original experience: it is as difficult to reverse a set of movements in drill as it is to say the alphabet backwards.

Lastly it may be noted that the lapse of the volitional element in a habit involves the loss of the first pleasurableness of the action. "Old fogeyism" means, among other things, dining out, travelling abroad, etc., long after the activities and their results have ceased to yield substantial enjoyment. We continue these actions just because we have got into the groove of habit, and should perhaps miss doing them.

We have seen that in the execution of habitual movements a true volitional process occurs, if at all, only at the outset. Volition, however, immediately reappears upon the scene if the mechanical smoothness of the process is interrupted by any difficulty. The knitter is compelled to suspend the enjoyment of her novel in order to pick up a dropped stitch, and the crossing of a stile punctuates conversation.

Strength of Habit. Habits, like the connections between ideas, are of very different degrees of strength. The degree of perfection of a habit may be estimated by the promptness and the uniformity of the active response to stimulus. Thus the soldier's automatic obedience to an order, as "Attention!" is "mechanically perfect" when it follows instantly and is equally prompt in every instance. The practical jokers who, by shouting "Attention!" caused their soldier comrade to drop the dinner he was carrying, were well aware of this. The strength of a habit may be estimated in other ways also—for example, by the difficulty of controlling and of altering it, and further by the amount of discomfort which attends its accidental non-fulfilment.

Formation of Habits. A motor habit may arise automatically, without our going through a preliminary stage of volitional acquisition. This applies to the tricky accompaniments of writing, such as putting out the tongue, which, according to Judd, grow out of the diffusion of nervous currents (see above, p. 365).[1] It applies also to such early and temporary tricks as sucking the thumb on going to bed,[2] and to quaint little gestures picked up by a semi-conscious process of imitation.

As these examples suggest, there is a close connection between habit and instinct. Instinctive movements are characterised by automatism, but they differ from habits in that they are not acquired by the possessor but are part of his congenital endowment. Since they appear at the period of greatest plasticity they form a basis for the formation of many habits which the individual may require. Prof. Judd gives examples of habits growing out of modifications of instincts. Thus the permanent attitude taken up by a child towards animals, such as the cat, is a habit formed out of a sort of compromise between the two instinctive impulses, attraction and fear.[3] Quasi-instinctive modes of action, such as curiosity, acquisitiveness, imitation, are fertile sources of habit.[4] Curiosity may easily be turned into thirst for knowledge, and acquisitiveness into orderly collection and classification. Such habits have a special strength and value, being grafted upon a natural propensity.

Confining ourselves, however, to habits which are acquired by a truly volitional process, we may see from the above account that they involve two things: (1) a perfect mastery of a certain movement or group of movements, and (2) a firm connection of this with the presentation of a definite situation. The perfection of habit in the

[1] Judd, *loc. cit.*

[2] For a good account of the sucking habit, see K. C. Moore, *Mental Development of the Child*, pp. 12 ff.; *cf.* M. Baldwin's account of the development of the habit of right-handedness, *Mental Development*, chap. iv.

[3] *Psychology: General Introduction*, chap. viii.

[4] *Cf. Problems in Education*, by W. H. Winch, p. 71.

soldier's response to the "word of command" is the result of all the initial effort put into the mastering of the action, and of the prolonged and unvarying repetition involved in years of drill-exercise.

In the early years habits are in the making. Owing to the plastic condition of a child's central nervous system, the building up of a habit is, in this period, much more rapid and less costly than at any subsequent period. In the later stages of youth a more extended process of acquisition, *viz.*, a severer initial effort (or rather series of efforts), as well as a much longer course of repetition, is needed to fix action in a definite direction. Not only so, since the habitual modes of movement acquired in early life, like the first impressions about things, are persistent and difficult to get rid of, the formation of good habits later on is obstructed by the tenacity of the opposed early habits. A child, for example, that has been allowed to adopt an awkward way of sitting, useless motor adjuncts in writing, or unpleasant tricks of manner, gives special difficulty to the educator just because of the process of disorganisation, that is, the breaking up of organised combinations, which is involved in "unlearning" the habit.

Fixity and Plasticity of Movement: Habit and Adaptive Growth. Owing to the recurrence of similar circumstances and similar needs, a considerable part of our life —our routine life—comes under the dominion of the principle of habit. Thus the actions by which we care for the needs of the body, our behaviour towards others and so forth, are controlled by this principle. Habit in this way is clearly advantageous through the reduction of a once difficult action to an easy automatic type, the nervous energy consumed in the early stages being economised, and set free for other purposes. So far, then, as our life-circumstances remain unaltered, and similar lines of responsive action are required from us, the working of habit is a clear gain. The fixity and speed of response secured by habit are a first necessity in the schoolroom.

Nevertheless, habit is a tendency which needs to be

balanced by another and opposed tendency, namely, that readiness to modify and adapt our behaviour which underlies all development (see above, p. 69). Habit must not go further than the uniformities of human life necessitate. To carry the principle beyond this point is to fall into a rigid narrowness and woodenness of behaviour. So mechanical an action as writing may be unduly narrowed and stereotyped by habit, when, for example, a boy later on finds himself unable to write a letter save when comfortably seated at a table in a particular bodily posture. Again, the expression of thought is too narrowly circumscribed by habit when confined to one organ of expression; as in the case of Goldsmith, of whom Johnson said "no man was more foolish when he had not a pen in his hand". This undue narrowing appears, in another form, in the mechanical puppet-like sort of "good manners" with its stiff bow and the rest. Good manners must, no doubt, grow into a habit, but they must remain *a modifiable habit*—our modes of accost, our gestures, etc., adapting themselves to the particular circumstances of the moment, and to the particular person whom we are addressing. While, then, the formation of habits is an important part of what we mean by mental and moral development, it is not the whole. Fixity in definite directions must not exclude plasticity and modifiability in others. The complete and absolute rule of habit marks the arrest of development (compare below, Note D, "Ambidexterity").[1]

It may be added that all habits which are really serviceable to us retain an intelligent element in the *discrimination of suitable situations.* My latch-key-production habit fails as soon as absence of mind leads to its performance before the wrong door. Fatigue and loss of mental power show themselves in this non-adaptive widening out of habits, as when the pencil and pipe get put into wrong pockets. Thus a habit may be defective either by an undue narrowing or by an undue widening of its scope.

[1] Compare Baldwin on "Habit and Accommodation," *Mental Development*, pp. 168, 169.

Educational Control of Movement.

Exercise of the Motor Organs: General Aims. As already illustrated, the child's attainment of the command of his organs of movement is greatly promoted by the direction of others. No doubt, as Rousseau urged, a boy brought up in the country and left much to himself would develop considerable flexibility and precision of movement; yet it is equally certain that he would not reach a full many-sided development of motor powers, including such complex and difficult co-ordinations as are required in the civilised life of to-day, *e.g.*, those of reading aloud, writing and drawing.

The work of training the muscular organs belongs in part to what is called Physical Education (*cf.* p. 34). The prominence assigned to the development of the muscular system by kindergarten exercises, gymnastics, and the encouragement of out-of-door games, points to the recognition of the dependence of the general health and mental efficiency on muscular development. In its more elaborate forms, involving special practice and skill, bodily training aims at the development of a bodily excellence, *viz.*, the strength, agility, etc., of the athlete, something distantly resembling the old Greek ideal of bodily perfection.

The methodical exercise of the organs of movement connects itself, on one of its sides, with the processes of Intellectual Education. This is illustrated in the familiar work of the primary school, reading, writing, etc. But a larger view of the connection between manual movement and intellectual training takes us beyond this. We are beginning to see that in exercises such as drawing, sloyd and the like, which engage eye and hand in the finer processes of reciprocal adjustment, the intelligence is beneficially exercised, that here, as in the earlier kindergarten occupations, the child *learns by doing*. More particularly, as has been pointed out above (p. 187), drawing is educative less, perhaps, as a fine-art subject than as

one of the most effective means of developing a fine and accurate visual observation.

Another aim which this methodical development of the organs of movement sets before itself is the formation of a general basis for useful action and technical work. Although general education has not to train specially for the useful arts, in exercising a child's hands it seeks to make the fingers ready and skilful, and so to develop a general manual aptitude, which may afterwards be specialised in any particular line of technical training. The occupations of the kindergarten, such as paper-folding, stick-laying and the like, develop nimbleness of finger and precision of movement, as well as ease in acquiring new co-adjustments; and in this way they form a useful elementary stage in the development of muscular skill, while the sloyd and other exercises of the school follow up this aim.

Again, the value of these early motor exercises depends on the circumstance that they train the child in simple processes of volition. Movements are in every case the product of the child's own conscious impulses, and as such are exercises of will. It is in movement that clear purpose and intention first display themselves, and that the first experiences of obstacle and the first training in steadfastness and patience of effort are reached. Hence the growing recognition of the importance of the rule: In forming the will, start from its outer or motor side.[1]

Methods of Bodily Training. In assisting in this early stage of will-development the educator should bear in mind what Rousseau so ably emphasises, that children, being strongly disposed to use their muscular organs, develop their motor powers up to a certain point by self-education. Hence, they should from the beginning have ample opportunity for freely exercising their active organs, with only a general supervision and, at most, the imposition of a few necessary restraints. The nursery, and later the playground, should be so arranged as to

[1] For a careful discussion of this maxim, see Meumann, *op. cit.*, i., pp. 314 ff.

suggest and encourage vigorous bodily movement, as well as to direct it into definite lines of exercise. The important part taken by imitation and play in the growth of voluntary movement suggests the advantages of companionship in those early stages of education.

The regulative province of the educator in the first exercises begins with showing the child how to do things. To know when to show, and when not to show him, requires judgment. It is often better to cultivate the valuable quality of *initiativeness*, by requiring a child to strike out his own way of doing a thing, just as it is sometimes well to require him to discover the reason of something about which he asks. A mother who is ever interfering with her child's spontaneous activity, from an excessive desire to regulate it, is losing sight of the first condition of all mental development.

As the child grows, his actions become, in one direction, freer, in another, more subject to the control of the educator. The parent has at an early stage to begin to drill him in the proprieties of civilised life, bidding him sit at table and hold his spoon in the prescribed way, articulate his words in the approved manner of educated adults, etc. And to this home instruction there is added later the more systematic training of the school. In the varied muscular activity of the kindergarten, in the manual exercises of drawing, writing, sloyd, etc., and in the employment of the vocal organs in reading and singing, the teacher trains the child's muscular powers in a number of different lines of orderly constructive activity.

The object to be aimed at in all such exercises is to lead the child on to the best possible use and management of his organs of movement. The ideally perfect action is one which is fully adequate to the purpose in hand. At the same time, it follows Nature's law of economy—the reaching of a result with the minimum expenditure of energy. This law, by the way, is illustrated in many of children's self-prompted actions, such as the invention of easily executed manual signs for making known their wants.

In this branch of early training a reasonable amount of effort should be called forth, since only so can there be a training of the will. The child's natural inclination to "chuck" his tasks before they are completed should be strenuously opposed and overcome. Here, it is obvious, an appeal to some motive other than the mere pleasure of activity will often be needed. The educator will try to awaken ambition to do what is done by those a little in advance, also to arouse the wish to please others, and even something of the *moral* impulse to be "plucky" and honest in carrying out work.

Lastly, since every perfect action takes on something of the character of a habit, the educator should, throughout this training of the motor powers, aim at furthering the growth of useful habits. Hence he should insist on an adequate initial effort, an unbroken continuity of performance, and the other conditions on which habit depends. Primarily at any rate, the educator must focus his attention on securing the help of that valuable ally, the fixed direction of nervous currents which habit implies.

The careful graduation of work according to capability is illustrated in the method of teaching deaf-mutes to speak by imitating the lip-movements of the speaker. The teacher begins with such movements as extreme protrusions of the lips (as in uttering the *oo* sound), which are distinctly visible to the child when he himself performs them, and so easier of imitation. Only after a certain practice in this simple form of imitation does he try to call forth the more delicate and less easily seen movements of the organs of articulation, the learning of which has to be guided by touching the throat of the teacher.

NOTES.

Note A (p. 478).—In the above account of the relation of feeling to conation we have sought to avoid too extreme views. The hedonistic psychology of Bentham, Bain, and others taught that all voluntary action aims at pleasure or the avoidance of pain. To-day there seems to be, as a natural reaction

from this view, a tendency to ignore the large part played by pleasure and pain in human action. W. James, for example, after stretching the limits of instinct as far as possible, developed a theory of volition in which the *rôle* of pleasure and pain is reduced to a minimum.[1] More recently, Prof. Stout has not only emphasised the originality of the conative tendencies, but has tended to view feeling as a phase of, or incident in, conative process, that is as satisfaction (or dissatisfaction) of conative tendency.[2] In this case as in that of the relation of sensation to feeling touched on above (pp. 362, 390), we need to beware of losing sight of the claims of feeling. Though we cannot make actual separation of feeling and the conative impulse immediately springing from it, we can certainly distinguish the two elements as ultimately heterogeneous; and, as shown in the text, we can have experience of the one without any correspondingly full experience of the other.

NOTE B (p. 481).—Prof. Thorndike's interpretation of his curves has been challenged. Critics of his view deny that the process was gradual. They maintain that there was a *sudden* change in the direction of the curve and that this means, either the operation of the Law of Sudden Attainment, or the exercise of a rudimentary process of reasoning.[3]

NOTE C (p. 498).—Of late there has been a discussion as to how far kinæsthetic ideas enter into voluntary movement.[4] Is it possible to have ideas of movement in playing a game of tennis? The answer seems to turn upon the degree of expertness of the player. The "professional" plays so swiftly that there seems to be no time for the rise of such ideas in his consciousness. On the other hand, the hesitation and inaccuracy of the beginner seem to show that in his case ideas may be present. In learning a new stroke in billiards we certainly seem to have an idea, and possibly an image, of the new movement required. When such a movement is made with facility it may be said to have become habitual, going off by itself with little, if any, conscious effort. The answer to the question would thus appear to vary according to whether the movement has or has not this facility. Is it possible then that a professional tennis player, engaged in a game with his equal, plays in a quasi-mechanical fashion? Part of the business of such a player is to acquire a speedy reaction to all possible positions of the ball, and victory goes to a player when he delivers a ball for which his companion has no immediate correct response, or which through fatigue or accident he fails to return. The advantage of a left-handed player largely lies in the power to put the ball in unaccustomed positions: his opponent hesitates or mal-adjusts, and is lost.

[1] *Principles of Psychology*, ii., pp. 549 ff.

[2] See especially *Manual*, Bk. ii., chap. viii., § 5; *cf. Groundwork*, pp. 18, 19; compare W. H. Winch, "Conation and Activity," in *Journal of Philosophy, Psychology and Scientific Methods*, vol. vi., pp. 507 ff.

[3] See especially Hobhouse's *Mind in Evolution*, chaps. vii. and viii.

[4] See an article "On the Function of Images," by W. H. Winch, *The Journal of Philosophy, Psychology and Science*, 1908.

This question of the presence and function of motor images in movement is closely related to that of the rôle of motor experiences in the development of perception (see p. 173). In the case of teaching children to draw or write from a copy, this problem has assumed the form: Do the motor images developed by experiences of the moving hand assist in rendering the perception of the model form more precise or vivid? A lively discussion of this point has recently been carried on by two German professors. Lay asserts that motor experience does assist, and that drawing or writing "in the air" before doing so on the paper promotes correct execution. Meumann vigorously denies this.[1]

NOTE D (p. 504).—*Ambidexterity.* It is sometimes urged that right- or left-handedness is a case of an undue limitation imposed by habit. Seeing that single-handedness is a universal rule this is a heavy charge, amounting to saying that the course of evolution has led to an unwise habit. "We use both feet, both eyes, both ears,"[2] and therefore we should use both hands. Is it not, however, evident that, while we seldom have occasion to use a single eye or a single ear, and hopping would be an absurdity, the hand is often used by itself, and has not a single function such as seeing or hearing, but many functions? When our remote ancestors went on all fours, doubtless they used their "hands" in much the same way as their feet, but with the attainment of the upright position the hand assumed entirely new uses, continuously becoming "a more perfect instrument to carry out the behests of the brain".[3] The very variety of possible uses has compelled specialisation.

A second argument is that fatigue might be staved off by using each hand in succession. This involves the pains of learning twice over, for it is as difficult to train one hand as the other. The argument further assumes that the brain-centres for each hand are unconnected, that fatigue of the one does not lead to fatigue of the other. Such an assumption is unwarranted. Prof. Michael Foster warns us that "we must bear in mind that in a voluntary movement fatigue is much more of nervous than muscular origin".[4] Such fatigue radiates first to allied centres, and it seems highly probable that it is impossible to fatigue one hand without at the same time considerably impairing the efficiency of the other.

[1] See Meumann, *op. cit.*, ii., pp. 196 ff. and pp. 316 ff.
[2] Liberty Tadd, *New Methods of Education*, p. 48.
[3] Clodd, *The Story of Creation*, p. 151.
[4] *Text-book of Physiology*, vol. iii., p. 1154 (*cf.* above, pp. 33, 34).

CHAPTER XIX.

DELIBERATE ACTION: MORAL CHARACTER.

General Character of Higher Conation. In the preceding chapter we have traced movement to the ideational level. Before dealing with the highest developments of conation we must enlarge upon the importance of this level. The possession of free ideas renders possible a great variety of desires, some that can be realised as soon as thought of and others that can only be realised by a thoughtful co-ordinated line of action spread over a considerable period. How does this rational, systematised, far-seeing action arise?

We may recall here what has been said of the self (p. 312). At the ideational level there gradually emerges that most central of all ideas—the *idea of self* with its cluster of memories, interests, strivings—to which all other ideas are intimately related. As we shall see presently, this idea of self tends to appear, with some clearness at least, in the higher processes of conation. All volitional action is pre-eminently *my* action.

The higher volitional processes presuppose, along with this development of the idea of self, a development of the whole intellectual and affective life, the course of which we have already traced out. They are conditioned, too, by repeated exercises of the conative function itself. We will first examine the effects of the former.

(*a*) **Effect of Development of Feeling.** In the first place, the expansion of the life of feeling, and, more particularly, the gradual evolution of the higher emotions and sentiments, will serve to develop new forms of desire and

motive. The growth of every new interest and sentiment involves a new line of activity. Thus, the keeping of pet animals may absorb much of a boy's time and energy. Again, the development of self-feeling under the form of personal ambition and the desire to excel will necessarily contribute new conative forces. Not less important in this respect will be the development of the social feelings, including the affections, sympathy, and the humane sentiments. As these feelings grow stronger a child will desire to fill a worthy place in the school and home, to cooperate with his fellows and to obtain and keep their good opinion. The more abstract sentiments, too, with their larger conceptions of value, will play a vital part in the higher development of conation by co-ordinating and systematising the desires and efforts under comprehensive forms of "my good".

(*b*) **Effect of Intellectual Development.** We now pass to the influence on conative growth of intellectual development, of gradual progress in recalling the past and forecasting the future, in comparison, etc.

This progress will promote a larger range of desire. The young child, like the savage, is incapable of aiming at a remote gratification, say the pleasure of winning a future reward. The idea of the remote end is not vivid and steady enough to direct action into effort for something remote. An increased ability to construct time-relations and steadily to represent what is remote in time is necessary before he will direct effort to what can only be realised by a prolonged series of efforts.

Hardly less important is the aid rendered by the growth of comparison, of a clear apprehension of relations, and of the impulse to co-ordinate parts into a whole—that is, of ideal construction prompted by some interest. Aiming at a distant object means reflecting on the connections of things, and seeing how present action may become a step in a process of gradual attainment. Even so short a conative process as building a castle with toy-bricks or sand requires a certain ability to form a plan of action and

to fit in this and that movement as definite stages in the order of the plan.

This organisation and unification of action under the guidance of thought takes on a higher form when a series of actions of a like kind is integrated by reflection into a general rule of action directed to one comprehensive and permanent end, which is a factor in self-realisation. This is illustrated when a child begins consciously to act under the direction of the general rule of trying to win and preserve as something permanent his teacher's approval. This unification of action, when carried out with full reflection, involves the co-ordination of a series of actions in an orderly *progressive* scheme of self-realisation. The abiding "interests" of life, such as knowledge, the good opinion of others, professional success, are ends which only realise themselves gradually, and in so far as we are conscious of the self in its relation to a larger social whole. The process of volitional unification is carried a stage further when a youth begins to co-ordinate these several "interests" as parts of the realisation of the ideal self. This involves the exercise of the "practical judgment," and an appreciation of the "objective values" of things.

The final stage is reached when "my good" as a whole is co-ordinated, and in a measure identified, with the moral end or the common good. This reconciling synthesis of aims grows out of the free acceptance of the moral law as inherently right and good and as embodied in the current ideals of the community.

As the result of this influence of the growth of feeling and of thought upon conation, action takes on the appearance of a rational act, *i.e.*, one having its "reason" in a reflective purpose. This transition from the perceptual type of impulsive, to the later type of rational, action brings in more of the element of calm deliberateness. It involves the *reflective* consciousness of self as responsible agent with a past and a future, all of whose actions need to be co-adjusted as parts of a consistent whole.

Of all this work of consolidating action and subjecting

o rational rule we see only the feeble beginnings during years of childhood. Its fuller development belongs comparatively late period when reason begins to attain proper strength and dominion. Even in the case of lts, the organisation rarely proceeds in the orderly thodical way described above. So far as it is carried at all, it is done in a much less reflective way, and n half unconsciously. The more methodical procedure resents rather what is ethically desirable than what ually takes place; just as our accounts of the organisa- of thought—which closely resembles that of volition present rather ideal processes as conceived by logic our actual mental processes.

) **Exercise of Conative Function.** The development olition in its higher forms is aided, further, by exercises he conative function itself. The earlier half-instinctive s of action prepare the way for these higher forms. s may be illustrated by a reference to the transforma- of imitation from its early impulsive, into its later ctive or deliberate form.

eliberate Imitation. This higher form of imitation arked off from the earlier forms by the presence of a ose or motive. The boy who as a child imitated his er by pretending to smoke, may, when he has grown e a youth, become a serious smoker. As before, he ates; but instead of obeying a blind impulse he has an intention to smoke. He wishes to be manly, and im the pipe has become an outward and visible sign anhood. One important variety of this deliberate imita- connects itself with the impulse of rivalry, as when nior boy makes up his mind to attempt to equal feats of some schoolfellow. This emulative action ies special attention to the conditions of success, such ligence, and the restraint of other activities which will fere with success. Again, deliberate imitation involves nderstanding of the situations and feelings of others. y when emulating his senior develops a new side of idea of self by imaginatively entering into another's

aims and motives. Hence deliberate imitation has a valuable socialising effect, tending to widen our sympathies, and to elevate us to the higher planes of moral experience and activity. There is, moreover, a reciprocal action of sympathy on such deliberate imitation, since a relation of close personal sympathy prompts not only to a semi-conscious adoption of gestures, tricks of manner, etc., but to a reflective adoption of certain approved lines of action. In many cases too, *e.g.*, the imitation of the father's manly ways, the impulse is supported by a warm feeling of affection and admiration. While, however, imitation may thus become an important element in the development of the will, its function is a limited one. At its best, it cannot be the equivalent of the freer and more independent kind of effort. Its highest function is to direct such effort into new and worthier lines of activity.

Progress implies, further, the effect of repetition in fixing a motive as a conative disposition. It is not enough, for example, for a child to have a deep affection for his mother: this affection must acquire strength and fixity as an impelling force, as a definite conative disposition. Similarly the subordination of particular actions to a general rule of action only becomes perfect as the result of a series of exercises. In this way isolated desires become subordinated to a persistent desire and unified interests, and may even attain to the enduring form which we have called dominant desires. This fixing of lines of action through the firm establishment of motive-forces involves what Herbart called the "memory of the will," which is, however, better described as an illustration of the great principle of Habit.

This elevation of the later-developed motives into a position of permanent effectiveness does not proceed in a smooth, unopposed manner. It is through experiences of struggle that most of us, at any rate, rise to the serener heights of calm rational conduct. We have now to examine this process of conflict, so as to understand how a higher type of deliberate action arises out of it.

Deliberate Action: Rational Choice. The appearance of conflict is a result of the expansion of the life of feeling and thought. A child, as he experiences a larger number of desires, and acquires the ability to take in remote objects of desire, will, in a given situation, be likely to be urged by more than one impulse. Take the simple boyish problem of having a half-holiday to fill up. The boy with many interests outside his school life will, probably, in such a situation be the subject of a larger number of impulses than the boy with fewer interests.

In certain favourable cases this emergence of a number of desires may lead to the agreeable result of a co-operation. In the case supposed a boy may want very much to look up some friend at a distance, and may also wish to have the bicycle ride which will take him to the spot. A strong disposition to motor activity, the mere love of doing things, may in this way combine, especially in the earlier, more vigorous years, with the pursuit of ulterior ends.

In this imperfect world, however, it seems to be a much commoner experience that the different desires which thus arise together oppose one another, and so give rise to what we call conflict of impulses. Such opposition will obviously delay or arrest action, instead of expediting it. Here we have a new phase of inhibition of movement. The first impulse does not pass into action because, almost simultaneously with its appearance, other conative tendencies arise.

Now is the occasion for the development of a new and higher form of conation, the arrest of action and deliberation. Under a strong temptation we can only effectually resist the seductive influence by "pulling ourselves up," which means pausing to think. This self-checking by a higher reflective self has to be acquired before a steady rational will can be developed.

This state of conflict may arise between the desire to do a particular thing, and not to do it from an aversion to some of its accompaniments, *e.g.*, going to the theatre and staying at home and so avoiding the heat, fatigue, etc.; or

it may take the form of a competition between two desires, say for an afternoon's cycling or rowing. In many cases the struggle and the decision which follow work themselves out in a semi-mechanical manner, the desire of the greater intensity and persistence winning the day. The decision becomes a particularly simple affair when some immediate action is necessary, as when we have to decide how to steer a bicycle at an awkward moment in a crowded street. Even in cases where more complex conative tendencies come upon the scene, the solution of the problem may work itself out in this half-mechanical manner. Thus, my paternal and my citizen self may for a moment come into conflict and a decision be reached without any appreciable weighing of motives or control of the result by "a higher total self". It is a mistake to suppose that all decisions as between two alternative courses of action involve the stately pageant of the total organised self, the judicial weighing and pronouncement and the rest, which psychologists are apt to make the one type of decision. Life is not long enough to allow of this.[1]

The more elaborate process of deliberative resolution occurs in exceptional cases—in critical situations in which some new and better tendency is struggling for mastery, or in which, owing to some powerful temptation, there arises a strong impulse to set at naught a higher group of conative tendencies. We may now consider what happens in this case.

Let us suppose that a well-disposed boy, who has given his word to his father to return home by a certain hour, meets a friend who makes an enticing proposal involving a postponement of his return. The suggestion excites a strong conative tendency which for the moment probably monopolises consciousness. The weak, ill-developed boy would in such a case run off with his friend and forget his promise. But our supposed boy, being inclined to act

[1] Mr. McDougall's interesting account of volition (*Social Psychology*, chap. ix.), seems to err by assuming that the self must always appear in volitional decision.

rightly, has the promise ringing in his ears along with the tempting offer, and he checks the impulse saying, "I must think this over". By delaying action he gives other conative tendencies and other parts of the self-system a chance of developing—for example his filial self, his self-respecting self, his honour-loving self. Not only the past self may rise up and say "Be faithful to me," the ideal self to be realised in the future may appear beckoning him away from the weaker and worse course (see above, p. 315). This appearance of a higher and larger self on the scene brings into play new feelings and motives, more particularly self-respect.[1] The self which tends to present itself, dimly at least, in these situations, assumes different aspects in different cases. Sometimes it appears as another person and addresses us as in the familiar German expression, "Du sollst," etc. Sometimes this higher self pleads warmly, while at other times it speaks in cold judicial tones. But the better self only seems to stand apart from us when the impulse to yield is strong. If the impulse is weak, it is the tempting voice which is thus projected outside the self—the self being now identified with the fuller and better organised tendencies.

Even when this more fully developed form of conflict occurs it is apt to get resolved in a somewhat haphazard way. We come to a decision partly from the need of deciding in some way, and partly from aversion to the misery of the state of suspense and conflict. The young, more particularly, are prone to cut short the inner conflict, as they will try to cut short the "jaw" of the offended father or schoolmaster. The alternative course predominant in consciousness when weariness has reached a certain intensity decides the issue. Or, if the conative tendencies seem to alternate and to balance one another, we are ready to "toss up for it," and so make an end. Weak persons, who hate having to decide, try, where it is possible, to postpone the decision till to-morrow—not in

[1] See McDougs

order to reach a calmer decision by "sleeping over it," but merely to get rid for a time of the intolerable strain. Or, feeling that deliberation brings them no nearer decision, they will abandon the problem altogether and let things drift.[1]

In this higher conation, it is to be noted, we have to do with *motives*, that is, conative tendencies which have become generalised by embodiment in ideas of certain ends, interests, or forms of "my good," *e.g.*, others' good opinion, or duty. Motives belong to a higher plane than impulses, and involve some amount of organisation of interests and conative tendencies in the conception of a total self. When a boy decides to act prudently or honourably he is *moved* to act by the motive of prudence or honour. It may be added that what, as preceding and determining the action, is a *motive* of the action, becomes afterwards, when viewed in retrospect, the *reason* for the action.

Persistence of Decision. When the decision is arrived at, action follows as circumstances permit. Immediate action is not always possible. A boy who makes up his mind to confess a bit of cheating, or other shabby action, but is unable to do so until to-morrow, has to develop a *persistent* conative attitude. This supplementary stage of volitional process has, as we all know, its special difficulties. To hold firmly to a manly resolve, to act when action means shame, to shun the path of least resistance, tries the mettle of a boy's will. It is a much harder task than the maintaining of a fixed purpose in carrying out a prolonged action, *e.g.*, the finishing of a written exercise which bores and wearies. Both illustrate the quality of perseverance, though in different forms and unequal degrees of difficulty. This perseverance may be said to be the persistence found at the perceptual level developed by the growth of ideas and having an outlook into the future. Persistence of decision is aided by certain feelings such as

[1] The student should read Prof. Stout's account of voluntary decision in the *Manual* (last chapter) with its quotations from Prof. Royce.

pride or self-respect, and the wish not to lapse into what looks like a weak and ludicrous inconsistency.

While readiness to deliberate and decide gives to our volition its reasonableness, abiding by our decisions and persevering in our line of action gives to it its firmness or stability. The young are, in general, wanting in such firmness, just as they are wanting in stability and consistency of feeling and judgment. Yet there are curious differences; slowness in deciding not being always followed by persistence in resolution, while with some, like Charles Ravenshoe, in Henry Kingsley's novel, *Ravenshoe*, a mad impulsive way of forming a resolution is followed by an "honourable obstinacy" in sticking to the resolution. To form a resolution, moreover, say to have a tooth extracted, is in many cases much easier than to adhere to it when the actual situation is imminent, as in confronting the dentist's door-bell.

Stability of decision, which we regard as a good thing, must be distinguished from *obstinacy*. Each involves a fixed attitude of will and an independent self-assertion. Yet the resemblance is smaller than it looks. Without going so far as Herbart and saying that obstinate self-will in a child is really absence of will, one may say that it frequently differs from enlightened firmness inasmuch as it depends on the fixity of a *particular* idea, which keeps up an abnormally intensified desire for this one thing and only for this; whereas the latter is the outcome of a process of reflective decision. Yet self-will is often more than this, implying even in children the consciousness of self and the legitimate effort to realise it. Foolish obstinacy may rest on a firm even if erroneous persuasion of "I know best".[1]

Volitional Control. The exercise of reflection and rational decision just described leads on to what is called Volitional Control or Self-control. By this is meant the establishing of rational motives as fixed principles of con-

[1] Compare Mrs. Bryant, *Educational Ends*, p. 21.

duct. A child illustrates a germ of this control as soon as he begins to inhibit impulse, and to bring into his actions the rudiment of a rational principle.

Control is often spoken of as if it were merely inhibitory or restraining. Professor Royce writes: "You in vain teach self-control unless you teach much more than self-control".[1] It is better, however, to regard control as having a positive as well as a negative aspect. Thus, we may be said to control a thought or a motive when by concentrating attention upon it we keep it prominent in consciousness.

(*a*) **Control of Impulse.** This form of control means the due regulation of the "natural" impulses. It shows a series of progressive stages corresponding to the stages in the evolution of rational conation already described. For example, a child first learns to control a strong impulse to snatch at a present pleasure by calling to mind some future penalty; and, later on, to subject single desires to comprehensive and permanent aims or "interests".

Throughout this process there is inhibition and, concurrently, a direction of the lower by the higher. The "natural impulses" are not crushed out of existence, they are merely kept down and allowed a subordinate place in action.

(*b*) **Control of the Feelings.** One of the most important directions of volitional control is the regulation of feelings. As we have seen, feeling in all its more intense forms has a well-marked bodily accompaniment which includes contraction of the voluntary muscles of the limbs and vocal apparatus. In the case of the emotions this bodily accompaniment, by reason of the new sensations to which it gives rise, contributes new elements to the whole mental state (*cf.* p. 378). It follows that control which can directly act on the voluntary muscles so as to inhibit their action, may allay the force of the emotional

[1] See *Outlines of Psychology*, pp. 76, 77.

outburst. A child's emotional excitement is first restrained by the force of personal suggestion acting through language, as when the mother impressively says, "Hush!" and the first clumsy attempt at self-control must begin in an attempt to keep still.

At first sight it would seem best to allow the emotion to spend itself: but since the law of habit governs all mental states, this course would mean that the passion would be strengthened and rendered liable to be revived on ever slighter and slighter occasions (see p. 399).

What may be the exact effect on the feeling itself of this restraint of muscular movement depends partly on the hold which the feeling has acquired on the child, and partly on his temperament. There are children who, even when outwardly calm, brood on their terrors, their injuries and so forth. Hence the need of the supplementary means of restraining feeling to be spoken of presently.

The due control of the feelings has a high moral significance. In what is called good-breeding there is involved a considerable amount of checking and hiding feeling. The higher moral quality of considerateness implies a wider and more vigilant self-control, *viz.*, the repressing of every sign of feeling that would be likely to offend others. In another direction, the moral qualities, endurance and courage, include the ability to inhibit the manifestations both of actual suffering and of the disturbing action of fear.

Here, again, we may note that control is not merely repressive. A perfect regulation of the life of feeling by volition includes the methodical cultivation of good or worthy feeling. This applies, for example, to the keeping up of a cheerful, happy state of mind. As Dr. Johnson has pithily remarked, "Vivacity is much an art, and depends greatly on habit". It applies also to the deliberate cultivation of kind feeling, reverence and the like. Such a positive fostering of feeling, though it may be furthered to some extent by adopting the characteristic bodily mani-

festation, mainly depends, as we shall presently see, on the maintenance of certain ideas.

The acquisition of the power of controlling feeling is a difficult and slow process. Children's emotional states, as pointed out, are characterised by great intensity, and by complete possession and mastery of the mind. It is to be remembered, too, that the motives which prompt to efforts of self-control, *e.g.*, a regard for our own efficiency, or a sense of what is seemly and right, are late in their development. Nevertheless, it is just here that the "tone" of a school acts. Nothing so impresses the new scholar as the sight of the habitual restraint and orderliness of a well-conducted school.

(*c*) **Control of the Intellectual Processes.** When control is wanting, attention is drawn hither and thither according to the play of external excitants and the particular ideas which may be called up by the forces of suggestion. The control of the intellectual processes means working against these chance influences by concentrating attention on something which we specially wish to consider. This has been illustrated in dealing with the processes of sense-observation, recollection, etc. So far as volitional effort is required in this case (see p. 130), its motive is the desire to give greater precision and vividness to certain intellectual elements, and to realise in consciousness their full suggestiveness: in other words, in its highest form, it is the desire to advance in knowledge. Hence it is only as this motive acquires strength and fixity that volitional concentration becomes habitual.

The importance of the volitional or controlling element in intellectual activity has been emphasised by many recent writers, both psychologists and others. As we saw in the chapter on Attention, a conative factor comes into all orderly intellectual process. To think, to imagine, even to recollect in its active form, is to carry out activity of a more or less purposive kind. Familiar sayings about the conditions of success in study, as well as about the

conditions of the highest kind of intellectual achievement by men of genius, illustrate the stress which the modern mind places on the conative factor in mental work. High capability of intellectual functioning is only realised when keen interests and strong volitional control at once excite and direct it.

Connections between Different Aspects of Control. It has been implied that the three directions of control just dealt with are closely connected. This is, indeed, a case of reciprocal action. Thus, while it is evident that the control of our ideas tends directly to the proper regulation of our feelings which, as we have seen, are largely dependent on ideas, it is no less true that in trying to think calmly and clearly we have often to work against the confusing effect of strong feeling and the insidious influence of that bias which less intense forms of feeling are apt to induce. Yet it may suffice here to emphasise the fact that the control of ideas is an essential factor in that of the feelings, and that the control both of feelings and of ideas is involved in that of impulse and action. A word or two may suffice to make this clear.

(1) As we have seen above, feeling is organically connected with sense-presentations, and the emotions depend upon certain modes of perceptual or ideational activity, such as the apprehension of something alarming. Hence to exercise control over the perceptions and ideas implies indirectly a more thorough and efficient means of restraining feeling than the inhibition of motor activity. The one certain method of reaching and mastering the force of feeling is by drawing off the thoughts from its exciting cause. A feeling of annoyance at a suspected slight from a friend is only completely mastered when we are able to turn our attention away from the irritating idea, by fixing it on other things.

In like manner, if we wish to induce a certain state of feeling, the best way to effect our purpose is to keep before our mind perceptions or ideas fitted to excite it. Thus when "down in the dumps" we may promote a gayer

mood by reading some pages of *Punch*. So, too, the culture of the higher sentiments, *e.g.*, the love of truth, goodness and beauty, can be methodically carried out by dwelling on the appropriate ideas.

(2) Again, since feeling and ideation are both involved in volition, the perfect control of action includes the other forms of control. The impulse to act unkindly is only completely overcome when the feeling of anger out of which it springs is repressed, and the idea of the injury which excites the feeling banished from the mind. Hence the importance assigned by moralists to the control of the desires and thoughts "of the heart".

The same holds good with the positive side of this regulation. If I am disinclined to exert myself, I may overcome my indolence by dwelling on the idea of the action and what will follow it—that is, by seeking to develop serviceable contrarient ideas.

The most important outcome of our slight examination of the processes of control is that *all control is ultimately effected by voluntary attention* (see above, pp. 130 f.). The processes just considered involve a special effort of subjectively determined attention, which strengthens some one presentation to the more or less complete exclusion of others. This fact explains the connection between negative and positive control; since, as we have seen (p. 143), we withdraw attention from an object by fixing it on another object.

These several aspects of control, which are characteristic of a matured volition, are acquired but slowly. Of the physiological basis of control science can, as yet, say but little. It seems certain that the nerve centres involved (in the frontal region of the cortex) are the last to be developed and the first to succumb to disease.

Habit and Control. The higher volitional processes just sketched come under that principle of habit which we have seen illustrated in voluntary movement. Deliberate actions and acts of control give rise, through the law of habit, to *fixed dispositions* which work themselves out with less

and less friction, though they do not become so independent of attention, nor so automatic, as motor habits.

Although a boy's first attempts to pause and consider before acting may be hard enough, after repeated efforts he will find his task growing easier.[1] Every new exercise makes the pause, the consideration, and the final calm decision more easy, till, as a final result, the whole process grows into a swift "natural" reaction, taking on something of the character of a "habit," and presumably involving the setting up of a special psycho-physical disposition. This result is furthered by a process analogous to the accommodation which enters into motor habit (see p. 500). That is to say, the mind ceases to be teased by the enticements which would divert attention and wreck, or at least retard, the calm decision. The gain in rapidity of decision, moreover, will be furthered by the growth of clearer ideas of ends, and the consequent advance in "knowing our own minds".

Moral Habits. The principle of habit has other and yet more striking results in fixing the several forms of control. Every time a child restrains an impulse, *e.g.*, greed or retaliation, he helps to fix action in this particular line. In this way, through repeated exertions, the higher moral force gains ground as a ruling disposition, and encounters less and less resistance. The outcome of this process is what Aristotle called a perfectly virtuous habit, such as a fixed disposition always to speak the truth.

The conditions of the formation of habits already pointed out have to be satisfied here. Besides an adequate initiative, it is most important that the good resolution be at once followed up by some practical effort. A feeling prompting to a worthy line of conduct must not be allowed to fritter itself out as mere feeling. Resolutions unacted

[1] Herbart supposes that children fail to follow up their effort because they lack a "memory of the will". But practice tells here, not so much by way of a conscious memory-process, as by way of a modification of later by earlier process, which, as we have seen, is the primary and more comprehensive form of retentiveness (*cf.* p. 69).

upon are sterile, and "Hell is paved with good intentions". There must also be no getting tired of trying to be good, but a vigorous and pertinacious following up of the first success, till the principle of habit consummates the process.

Every moral habit differs from a motor one in being a *general habit*. By this is meant that the modifying effect of accommodation or habit appears, not in the external form of the action, but in the internal disposition or motive, which grows fixed and more and more rapid in its effective utterance. This motive has for its intellectual complement a general idea, such as honesty, fidelity to promise. Each of these lines of conduct clearly comprehends an indefinite variety of particular actions. Thus, my patriotism, or civism, may prompt me now to go and vote for a particular municipal or political candidate, now to sign a petition, and so forth. These particular forms of motor activity, so far from growing habitual, may, when required but rarely or for the first time, need to be specially constructed or thought out. We see then, that the principle of habit applies only to one side of a "moral habit". The theoretic contradiction which seems to lurk in the conception of a "general habit," disappears as soon as we use the term "habit" in the wide sense already defined, and distinguish between the fixed general disposition and the variety of external responses which answers to this. A recent writer makes the interesting suggestion that the generalising of habit which occurs when the good effect of practice in one kind of work is carried over to another kind, is explicable by saying that it is the *ideal* of neatness, industry, etc., which is thus transferred.[1] This view assimilates the process to that of moral habit.

A moral habit frequently fails to be firmly fixed because of the indefiniteness of its form, which offers to indolence an easy way of evading the rule. Thus, a habit of kindness is very likely to be imperfectly realised so long as it is guided by the indefinite form of rule, "Perform

[1] W. C. Bagley, *The Educational Process*, ch. xiii.

acts of kindness". If, however, the rule is specialised and made definite in the form "Perform at least one act of kindness every day"—if it be only the writing of a cheering letter to a friend in distress—it is much more likely to lead to a firmly fixed habit of conduct.

On the other hand, in forming moral habits, we must beware of unduly narrowing our practice, so as to miss the generality and unifying effect of a true moral habit. Habits of thrift seem to be especially liable to take on a partial and scrappy form, leading not only to insufficiency, but to inconsistency of conduct. An individual, and even a State may display a tendency to almost reckless expenditure in certain directions along with a petty parsimony in others, and in those perhaps which have to do with necessaries. Such inconsistencies in forming habits are often amusing, as we may see by reading Mrs. Gaskell's *Cranford*.

Character. The term "character" (literally, "a distinctive mark") is not very easy to define. It is often used loosely to denote any group of distinctive individual peculiarities, whether these show themselves as strongly marked congenital tendencies, or, in part at least, as the result of experience and education. Character in this sense will be considered in the next chapter. In a narrower and more accurate sense the term marks off a group of developed tendencies, those which have become selected, strengthened, and firmly fixed by experience, education, and the individual's own efforts. Fixity or permanence of mental tendency, as distinguished from changefulness and capriciousness, seems to be of the essence of "character". In a still stricter sense the term has come to refer to well-developed and fixed conative tendencies, to a strongly marked type of volition with its steadfast purpose, its self-reliance and its indifference to the many waves of influence from without which carry the characterless man off his feet. Yet withal there is implied in character a certain plasticity of conduct, a peculiar modifiability of action as new circumstances arise.

While "character" thus refers primarily to a group of individual qualities, it has come in ethics and educational theory to denote a general type, namely, a good or moral character. In this enlarged ethical meaning the name still emphasises the fixity of certain tendencies, namely, the conative dispositions, together with certain directions of the feelings and thoughts involved in these tendencies. As Aristotle long since pointed out, this fixity of moral disposition is the product of the individual's own successive exertions. In its full connotation it is an *ideal* conception of ethics—that of the perfectly good will.

This moral or virtuous type of character involves, first of all, the organisation of thought illustrated above; also the development of the sentiments as a whole into a harmonious system in which the lower are subordinate to the higher.[1] It involves, further, the several forms of control just considered carried to the point of perfect habits; that is to say, the fixed dispositions involved in a wise pursuit of what we recognise as good, together with the habitual control of the feelings, and that firm direction of the thoughts which is at the basis of reasonableness. Finally, it includes a fixing of the special dispositions answering to the several virtues, and implied in a perfect fulfilment of human duty, such as courage, veracity, justice and beneficence. It is the work of Ethical Science to construct methodically the ideal conception of moral character.

It has been said that moral character is a "bundle of habits" or fixed dispositions answering to the several parts of virtue. This is an important definition, so far as it brings out the essence of character—fixity of volitional disposition in right directions. Yet moral character does not show itself in a habitual and half-mechanical pursuit of a number of detached forms of good. Control is essentially control of attention, and includes the disposition to reflect. A perfectly virtuous man would be one who was reflectively intelligent and strove to co-

[1] See McDougall, *op. cit.*, p. 259.

ordinate his several aims under an ideal conception of complete good, or fully realised self, which he made supreme, and who was always ready, when new circumstances arose, to modify his conduct on lines suitable to his ideal. That is, he would possess what Guyau called "the habit of rehabituating oneself".[1] He would always be prepared, in new cases of exceptional difficulty, to pause and reflect in the light of his ideal of right conduct. A physician may have to think long before he decides whether he should tell a lie to his patient; and even the nurse in Victor Hugo's story, *Les Miserables*, hesitated for a moment before telling her splendid lie in order to save the life of a worthy man. As Mrs. Bryant says: "Virtue can never become a sum of habits, and for this plain reason: there is not a single good habit except the habit of being good (*i.e.*, of a good will) that may not conflict with real duty at some point or other".[2]

It is to be noted that the disposition to reflect, here emphasised, does not necessarily mean a prolongation of the deliberate stage of an action. The best men, probably, do their reflecting when no practical problem is pressing, in the calm intervals of life. Only when it is thus carried out unhurriedly, shall we be able to make the stage of deliberation before action short, as it ought to be.[3] By thinking out more clearly in a leisure hour the purpose of our life, we prepare ourselves for the swifter kind of decision when the moment for action arrives, having then, for the most part, nothing to deliberate about save the most suitable means of reaching our end. No doubt, the feverish pace of life in these days is unfavourable to these old-fashioned exercises in reflection. Yet it is worthy of notice that a recent Italian writer on education has thought it worth while to publish a volume on Meditation as a valuable constituent of culture and of education.[4]

[1] *Education and Heredity*, p. 50.
[2] See her work, *Educational Ends*, p. 21.
[3] See McCunn, *The Making of Character*, p. 185.
[4] G. A. Colozza, *La Meditazione: appunti di psicagogia*, 1903 (see especially pp. 23 ff).

It is evident, then, that as in the earlier, so in the later processes of conation, habit, though an essential and valuable ally, must not be allowed to stiffen into narrow-mindedness. Much of the moral imperfection in men and women arises from adopting petty habits instead of broad general ones. Since moral reflection must supplement the particular virtuous habits, it follows, that *character is never rigidly fixed.* Habit, when carried to an extreme, involves, as we saw above, the arrest of development in a certain direction. Now a virtuous character aims at an ideal of a worthy personality which can never be fully realised. Nay, more, it is continually modifying the mental system answering to the ideal self by adding to it new moral experiences, new assimilations of the results of others' experiences and thought, and new individual reflection. It is this organisation of new elements which gradually makes clear to us what are the particular lines of activity in which we may best give effect to the commands of justice, veracity and benevolence. This self-educative work in giving a definite form and a rich yet ordered variety of content to the conception of the virtuous life may go on as long as fulness of life continues.

Early Rudiments of Volition. We shall detect only the crude beginnings of these volitional processes in early life; yet these deserve to be noted. Even a young child will now and again show a spontaneous tendency to pause before he acts. He will even intermit his outbursts of grief, for short intervals at least, and seem to make a feeble attempt to rise above his misery. At an early date impulses in the direction of right conduct begin to appear, such as those of kindness, helpfulness and so forth (compare pp. 389, 462).[1]

In vain should we look to young children for clear examples of steady, fixed purpose, for the essential constituents of moral character. Their impulses, like their

[1] These spontaneous tendencies towards good conduct are illustrated in *Studies of Childhood*, chaps. vii. and viii.

feelings, are capricious and unsteady: a good one being soon displaced by one that we regard as bad. So far from being morally an organised unity or personality, a child seems rather to be a bundle of isolated impulses and tendencies, and his behaviour the outcome of a number of separate and inconsistent moods. His "self" is as yet but half-formed and looks rather like a number of alternating, and more or less antagonistic selves. His character has to be formed by the organic processes touched on above.

Education of Will and Character.

The acquisition by the individual of the higher type of volitional process and of moral character is greatly furthered by the action of others. The formation of a good will implies the discipline supplied by a moralised community with its system of rules of conduct.

This moral action of the community on the individual works at first through the medium of those who have authority during the early years. As we saw in tracing the growth of the moral sentiment (see p. 466), the influence of authority and of moral discipline is a necessary condition in the formation of the sense of duty.

The training of the child's will to fixed and worthy lines of action proceeds partly by way of the early government of the home and the school, and the system of rules which this implies. We have now to examine the mode of action of this government on the development of the child's will and character.

Educative Function of Early Government. A system of government seems, *pace* Rousseau, to be necessary for the child, and to befit his condition, with its ignorance and inability to act. Part of the aim of such government is to protect children against the evil physical effects of their own actions. To leave a child altogether to the "discipline of consequences," in the shape of nature's penalties for violating her laws, would be too dangerous an ex-

periment for any one who really cares for children.[1] A child's actions have further to be restrained because they are likely to annoy or injure others. No parent would allow a child to strike another child, or to take even playful liberties with a visitor's pockets.

Early government has, too, a valuable disciplinary function. When properly organised and judiciously carried out, it supplies a certain *moral training*. It aims from the first at directing young impulse into right channels, and at developing habits of good conduct. The most optimistic view of child-nature must recognise the existence of natural impulses, *e.g.*, greediness and temper, which require restraining. Nor can it be safely contended that the natural consequences of wrong actions, such as the loss of the parent's confidence, can be counted on in the first years of life—save, perhaps, in the case of a few well-disposed children—to deter from such actions. It is probable that natural penalties alone would never suffice to develop a consciousness of the binding nature of duty.

Conditions of Educative Government. In order that the system of government may be morally educative it must exhibit certain features. The more conspicuous and the more predominant these features are made, the higher will be the moral value of the government.

To begin with, a good mode of government must proceed by appealing to an intelligent will. Mere physical compulsion, as when a nurse supposes she is getting a child to walk by dragging it, is obviously not government in any intelligible sense. Nor are those modes of exercising the "superior will" which resemble the methods of the brutal slave-driver, to be considered here. We can also neglect that irrational mode of restraining the actions of the first years by a number of unconnected single commands and prohibitions, as, "Do this at once!" "Stop that!"

Early government acts educatively on the young will

[1] See Compayré's *Pioneers of Education*, chap. v., "Herbert Spencer".

as soon as *general commands* are given and made clear to the child. The difference between proceeding by saying, "Do this!" and by saying, "Behave properly!" consists in this, that in the latter case the person in authority introduces a general rule of action, and thus acts beneficially upon the primal chaos of capricious impulses by promoting orderliness of action and something like a system of conduct.

Again, the educational value of any system of rules will depend to some extent on a judicious admixture of positive commands and prohibitions. In one sense prohibition is the more fundamental need: an inexperienced child must be restrained from dangerous and mischievous actions. Yet we must bear in mind that, as soon as a child's intelligence begins to develop, a prohibition acts irritatingly, by opposing itself directly to his love of activity and to his natural and perfectly healthy impulse to realise his own ideas and satisfy his own feelings. The worst kind of so-called "rule" in the nursery consists in piling up the annoying little "Don't's," and awakening a spirit of opposition to authority.[1] Positive commands, on the other hand, though they may conflict with children's spontaneous tendencies, do so less directly and obviously. Where they are wisely selected they suggest new lines of activity, which, if not at first enjoyable, may become so later.

Another point closely connected with this is that both command and prohibition act upon the child's mind by way of *suggestion*, similar in kind to, if less potent than, that exercised by a person who controls the actions of another in the hypnotic state. Yet, though both are forms of suggestion, they appeal differently to a child and call forth quite dissimilar attitudes. Whereas a command clearly suggests a particular action which the speaker desires to be carried out, a prohibition suggests quite as certainly a forbidden action. This is illustrated by an ingenious mode of advertisement once used in a London street. A "sandwich man" was carrying two boards, on

[1] See P. F. Thomas, *L'Éducation des Sentiments*, pp. 117 ff.

the front one of which were printed the words, "Don't look at my back!" where of course the advertisement to be looked at was to be found.[1] The great reason, however, in our ruling of children, for making the positive element more prominent than the negative and inhibitory is that while the latter works merely in a repressive way, the former works developmentally by calling out lines of worthy action.

The educative value of rules depends, further, on the way in which they are selected and enforced. It is only too easy, as Locke and others remind us, to multiply rules to an injurious degree. After all, government involves restraint, and a child, with his intense love of activity and his strong preference for initiating his own activities, may be led by the oppressive character of the rules enforced to resist, rather than to accept them. A like effect follows when a rule appears arbitrary, or is not clearly expressed. A similar remark applies to the mode of enforcing rules. Where the parent or teacher appears to a child to be partial and capricious in applying a rule, or to fail to distinguish between cases which do and those which do not properly fall under it, the educative effect is lost, and harm rather than good is done.

Punishment and Reward. A word or two may be added on the justification of punishment as a disciplinary or educative measure. It rests on the conviction that it may be made to bring home to a little culprit in a peculiarly vivid manner the seriousness of his wrong-doing, and so act correctively on his faulty disposition. According to this proper view, punishment is not merely the appending of a painful experience to a wrong act (which natural consequences might also introduce) but the strong expression of a determination to insist on respect for moral law, and to resist and put down disrespect of it and disobedience

[1] The subject of contrary suggestion is dealt with by Baldwin, *Mental Development*, pp. 145 f., and McDougall, *Social Psychology*, pp. 101 f. Illustrations of the process in dealing with children are given by Perez, *First Three Years of Childhood*, p. 108, and Sully, *Studies of Childhood*, p. 294.

to its commands. When viewed in this light by the young offender, and accepted as just, it may, so far from being resented and breeding animosity, deepen his respect for the person placed in authority over him.

This view of punishment at once suggests that it needs to be administered with great care and discrimination. To begin with, it ought not to be made use of save where the action clearly indicates more than ordinary thoughtlessness, *viz.*, *a disposition to disobey rules*. Even here it should be looked on as a last resource, and only resorted to when other means—such as talking to a child and pointing out his fault—have been exhausted. Hence punishment should not in general be inflicted for a first offence, save where this is a very grave one, but only for such repeated acts as indicate a fixed determination to disregard or resist authority. Even then we are not justified in punishing unless we have a reasonable prospect of acting beneficially on the young will; and for this we need, not only a wide experience of child-nature in general, but an intimate knowledge of the individual child.

When we have satisfied ourselves that it is a proper case for punishment, something remains to be done in selecting the right amount and the suitable form of penalty. A "sense of justice" in the educator shows itself in "proportioning punishment to offence". For this a fine sense of ethical values is needed, so that the seriousness of the offence may be adequately represented by the punishment. But this is not all. Since punishment in education aims more at correcting the individual than at deterring the pupils generally, the teacher cannot beforehand attach a definite penalty to every offence. As inflicted on the young, punishment is eminently a matter of adjustment to individual cases, to differences of age, character and sensibility, as well as to differences in the external circumstances.[1]

[1] Bentham's general principles for the proper adjustment of punishment to offence are valuable to the teacher, though they need to be considered critically when applied to early discipline. See Prof. Bain's *Education as a Science*, p. 106, note.

Locke tells us: "Remove Hope and Fear, and there is an End of all Discipline".[1] As punishment acts deterrently by arousing a child's dislike of pain, so a reward acts stimulatively on his love of pleasure. A reward may be defined as the giving of something to a child which he is likely to value—whether a "gift," or a position of honour—as a consequence of some special continuous exhibition of good conduct or merit. It is of the essence of a reward that it be given and accepted as an emphatic expression of commendation.

It follows that much so-called rewarding is not really so. When, for example, a mother promises her rather obstreperous children a special treat if they will only keep "good" through the ordeal of a stranger's visit to her, she is offering a bribe rather than a reward proper. As Locke says: "Rewards should be never offer'd or bestow'd on them (children) as the Reward of this or that particular Performance".[2] The educative value of a reward depends on its being given for a prolonged or exceptional exertion of will in some good direction. Its good effect presupposes, further, that it has not been previously counted on and definitely aimed at. The more spontaneous the giving of the reward the more likely is it to be taken as an emphatic expression of commendation.

It is just as easy to over-reward children as to over-punish them, and in some respects the effects are worse in the former than in the latter case. It fosters in the child's mind the idea that a reward is something to which he has a right, and at which he is justified in aiming. The keen desire for pleasure in the child tends, as Waitz and others have shown, to make a too free and injudicious use of rewards specially injurious.

School-prizes, to which the English school-system still appears to be obstinately attached, are to be carefully distinguished from rewards proper. As the result of competition they are not, strictly speaking, rewards for a

[1] *Thoughts on Education*, § 54. [2] *Op. cit.*, § 53.

rtain amount of exertion, since success turns on a com-
nation of two things—exertion and natural advantages—
e proportions between which may vary widely. They
peal, moreover, to a morally second-rate motive, the still
ghly esteemed impulse of rivalry (see p. 409). As a con-
quence, however—and this may turn out to be one of
eir redeeming features from an ethical point of view—
ey act only on the very few boys or girls of the form
o have a good chance of winning the coveted possession.

Praise and Blame. Punishments and Rewards are,
er all, morally useful only as an outward and emphatic
pression of disapproval and approval. As soon as a
ld under a fitting system of government begins to
quire good habits, and the love of approbation grows
ong and effectual as a motive, adventitious aids ought
become unnecessary. The word of rebuke or the
k of displeasure, with some loss of the teacher's good
nion; the word and look of approval, with some in-
ase of favour—these have a far higher educative
ction than the use of what are commonly known as
nishments and rewards.

But even such manifestations of approval and disap-
val may, if injudiciously resorted to, be mis-educative.
know when to blame, when to accept compliance with
e as a matter of course, and when to give commenda-
n, implies much knowledge, not only of moral distinc-
ns, but also of child-nature. We may readily depress
ng effort and produce indifference by much blaming, or,
the other hand, develop an excessive love of the sweets
praise by frequent commendation (*cf.* above, p. 388).

Praise and blame, like reward and punishment, act edu-
ively on the young will by supplying temporary stimuli
the habitual performance of duty. Both, like the at-
tions of the good doctor, aim at rendering themselves
necessary. The employment of them should be made
further the development of the child's understanding
what is right, so that he will suffer more and more
der disapproval, because he feels it to be just; and on

the other hand will, on receiving commendation, experience more and more of what Herbart calls the "joy of deserved approbation".

Praise and blame, in the form of public opinion, constitute a most powerful social sanction. In school life extreme expressions of this sanction are seen in the "chairing" of some youthful hero of the playing fields and in the "sending to Coventry" of the bully. It has the advantage of not issuing from one particular person, and on that account it is a valuable aid to school discipline, especially where, as in the best public schools, its action is moderated by a community of feeling between the masters and the older boys. In later life the struggle for "the bubble reputation" is scarcely less keen than the struggle for subsistence—so keen, in fact, that in the contest the finer moral impulses may be maimed and even killed outright. Hence the caution given above cannot be too often repeated. Praise and blame should be used sparingly, the teacher trying to call into play the higher and better motives wherever possible.

Educational Development of a Self-Reliant Will. If, as is commonly allowed, the chief end of moral education is to help to develop a will which aims of itself (*i.e.*, apart from external pressure and attraction) at what is good, it follows that the system of early government must little by little relax its hold. In proportion as the young subject grows in intelligence, he should be led to discern the intrinsic reasonableness of the rules of conduct laid down, and cordially to adopt them as his own principles of action. That is to say, he should be induced to fix his thoughts less on the external action and more on the internal disposition out of which it springs. This direction of the child's attention by the educator to morality as an indwelling state is furthered by the use of certain forms of language, *e.g.*, "*Be* good!" rather than "*Act* rightly!"—forms which have some value even in the nursery.

The action of education on the development of this "moral freedom" is real, and may become important,

though it is not easy to define its exact range. Certain writers appear to have overestimated its influence, partly, as in the case of Locke, from not fully recognising how much these higher moral attainments are the result of the individual's own exertions, and partly, as in the case of Herbart, from exaggerating the effect of the education of the intelligence and the feelings in securing the various lines of exertion implied. One thing is clear, that since the "reactions" to be called forth here are free, self-determining actions, the influence of education must be largely indirect.

A valuable preparation for the age of freedom may be contributed by the early system of government itself, when this is wise and good, and pervaded by the spirit of a worthy personality. The habits of obedience formed in a good home or school are valuable, not only as furnishing an element of stability of will and of subjection to general rule, but as indicating beforehand the directions which the free and self-reliant will is to follow. This applies not only to such small matters as those of good decorum or manners, and an orderly way of treating one's own person and belongings, but to the graver matters of mastering passion, of curbing impulse, and of practising the virtues of conscientious industry, truthfulness and so forth.

Nevertheless, this indirect action of early government is limited in its scope. The lines of action which we consider it necessary that a child should carry out in the home or the school do not, by a long way, coincide with the wide and varied field of human duty. And, as we have seen, habits of obedience, however necessary at a certain stage of human development, do not of themselves constitute virtuous dispositions: in order that they may grow into these, exercises in reflection and decision must be added.

In seeking to develop this moral "self-activity," education has, like the best art, carefully to conceal itself. It may act beneficially in many ways, but its action is most successful when never protruded. This applies to the

work of intellectual training, so far as this tends to develop the ideas which underlie an enlightened will and the feelings which prompt all the worthier desires. It applies, also, to the more formal kind of moral instruction. A wisely selected and skilfully presented example of courage, self-reliance or other moral quality, from the page of history or literature, may not only strike home, but start a long process of self-education. Hence the stress which the Herbartians lay on such humanistic studies.[1] It may be added that the beneficial effect of such instruction on the young will and character involves the subtle influence of the personality of the teacher.

Moral Suggestion. Perhaps the most valuable instrument in the educational development of the good-will during the school-period is Suggestion. This process, which has been more than once referred to in this work, does not lend itself to a simple kind of definition. Derived, as it is, from the exceptional and abnormal region of hypnotic experience, it carries with it a reference to the influence of personality—more particularly to that of a strong will or character as inducing beliefs and active impulses. A teacher does not employ suggestion so long as he uses argument and appeals to a boy's own reasoning powers. There is something akin to personal fascination in true suggestion. This rough definition will rule out the effects of a skilful and attractive mode of teaching, of selecting impressive examples of a principle, etc. On the other hand, a strong, emphatic mode of utterance, even when aided by a sonorous voice, may act suggestively by appearing to imply strong conviction in the speaker.

Applying this conception to the training of the young will, we see that it is fitted to be a potent instrument of moral control, constituting, indeed, a vital element in what we call the influence of the teacher's personality

[1] See F. H. Hayward, *The Primary Curriculum*, p. 35, and F. J. Gould, *The Children's Book of Moral Lessons*.

(*cf.* above, p. 404). Suggestion may be said to be at work in a less obtrusive form in the influence of *example*. The good action of another, especially when we respect him, influences us by showing us its possibility and by challenging us to go and do likewise.[1] But it is through the medium of language, backed by authority of some kind, that suggestion, as commonly understood, chiefly operates. All human utterance, which is decided and seems to express conviction, carries with it some amount of convincing force—as we may see by the readiness with which men will quite passively adopt the inherently weak statements of journalistic and other authorities. The force is the greater, the more we look up to the speaker or writer as an authority, and the more firmly the attitude of deference and docility towards him has been fixed in us. Hence, the high possibilities of suggestion in the case of the teacher when dealing with his pupils. The great moral value of suggestion in the teacher's hands lies in the circumstance that it may be resorted to when reasoning and demonstration are excluded. You cannot prove to a boy who is wanting in initiative and lacks self-confidence that he is able to exert himself, to master his temper, etc., like other boys. But you can show him that you believe in his capability of doing better than he has done, and so, through a suggestive transmission of belief, kindle desire and stimulate effort. This moral application of suggestion is *encouragement* in its complete sense—putting *heart* into the boy. Such Moral Suggestion carries to its highest stage the wise policy of substituting, so far as possible, positive commands for prohibitions and praise for blame. All children—though by no means *equally* suggestible—are so in a measure; so that we can adopt as our general rule that given by a recent German writer: "Assume that your children are as good as you want them to be"; instil into them the belief that they are "only capable of

[1] Suggestion and Imitation are closely connected by Keatinge, *Suggestion in Education*, chap. v., *cf.* Münsterberg, *Psychology and the Teacher*, chap. xix.

good"; gradually illuminating this blind belief by developing insight into the nature of this good.[1] (See below, note A.)

The fostering influence of education becomes still more indirect when the child is definitely left to exercise his own judgment, to act for himself, without command or suasion, or even bare suggestion, and with nothing to guide him but the known character and preferences of the educator. Such exercises in freer individual decision are absolutely essential to the growth of an enlightened will, and it is a part of the educator's work to supply them. Thus, alternative subjects may be set for homework, a choice of reading books may be allowed, or a variety of method in solving problems encouraged. The home, with its larger and freer range of activity, will of course offer a wider field than the school for this educative development of self-reliant will.

Moral Influence of the Home and of the School. As implied in what has been said above, the home and the school have each a characteristic function in the development of the child's will and the formation of his moral character. The home has special opportunities. For one thing, it acts much earlier than the school, at the time when "first impressions" are acquired. Some of the best men, who have taken the world into their confidence, have expressed their indebtedness to the early fostering influence of a mother. Again, in the home during the first years, the whole of a child's life and activity is controlled by others. He is watched and guided through the round of his daily activities, even his play being supervised and more or less determined for him. This all-comprehensive action of the home may continue long after the child goes to school, and begins to form outside attachments.

Again, the family relations, involving warmer affections and more habitual and intimate intercourse, give a peculiar

[1] Lay, *Experi. Didaktik*, p. 289.

intensity and depth to the moral influence of personality in the home. This applies in a special manner to the mother's controlling and guiding influence during the first years. In her directive action on the pliant young will we see the best illustration of the persuasive influence of example appealing to the more deliberate kind of imitation, and partaking of the character of personal suggestion. This personal influence of the mother is supplemented by that of the father, who, when the relations are favourable, has unique opportunities of strengthening the young will by supplying correction which is effective because it emanates from a respected and beloved person, and of proffering counsel which is the fruit of experience.

It seems to follow from all this that the home is fitted to act educatively on all the main directions of the moral life. Assuming that the family life supplies a child with companions sufficiently near himself in age, a happy and wisely supervised home should be made to cultivate the germs of orderliness, industry, veracity, and a sense of justice, together with the gentler and finer qualities of considerateness for others, and active kindness.

Contrasted with this, the moral education supplied by the school looks at first thin and unsubstantial enough. The schoolmaster has a definite work to carry out, and his system of government has to be worked out mainly with a view to this necessary result. Moreover, he stands in too artificial a relation to his pupils, and has too little to do with that part of their activity which is of greatest interest to them, to allow of the intimate personal sympathy and of the penetrating moral influence which are possible in the home. The schoolmaster, too, lacks the parent's means of getting at the innermost feelings and dispositions of the children.

At the same time, school life, including that freer part of it which is passed outside the schoolroom, introduces new and important moral influences of its own. It is in the school with its larger numbers, in which each finds

himself subjected to precisely the same rules, that the universality of law is first clearly learned. Still more important is the disciplinary action of the schoolmaster in insisting on prolonged and methodical forms of activity, and thus developing the qualities of industry, self-reliance and conscientiousness in work. To this it may be added that the *régime* of the school, just because of its cold impartiality, helps to develop self-reliance, and, in close connection with this, a consciousness of one's rights, and a keen sense of justice—more particularly on the side of equality—in a way in which the government of the home, at least in the early years, can hardly do.

In the freer intercourse with school companions outside the class-room a child finds, in a larger community of relatively equal wills, just those conditions which help to show the natural foundations of morality (see p. 463). It is now, when he finds himself a mere unit in an only partially known community, which is bound together, not by kinship and close sympathies, but at most by a circumscribed group of interests—when, moreover, he is thrown on his own resources, and has to find a *modus vivendi* with other equally unprotected units—that he first comes to a real exercise of his individual will. It is now, too, that he first makes acquaintance with a corporate feeling and public opinion on a small scale, and so comes under the influence of *law detached from a personality;* and though, as we know, this influence may be excessive, acting oppressively on individual liberties, and exerting its pressure in unworthy directions, it may also, when wisely directed, become the best preparation for a resolute taking up of one's station and one's duty in that larger community of strangers which we call the world.[1]

[1] "The school is something more than a mere extension of the . . . home. It is a social combination, with social feelings, sentiments and needs of its own. By constituting it at all, society has constituted it as a social organism, certain to produce definite social changes in . . . its members." C. A. Scott, *Social Education*, p. 9.

NOTE.

NOTE A.—The term *suggestion* (as involving a personal suggestor) has been used rather loosely in its application to education. One of the first to extend the idea of hypnotic suggestion to the personal influence of the educator was J. M. Guyau (*Education and Heredity*, chap. i.). The term has been extended very widely by M. W. Keatinge (*Suggestion in Education*); so widely indeed that it has lost much of its force as implying the pure and direct influence of personality. It seems highly desirable, if we wish to preserve something of its original force, to define it primarily as implying a process *analogous* to hypnotic suggestion. In the text we have emphasized the presence of a direct human influence working mainly through verbal assertion. This may be exercised by a particular individual, or by a number of persons, as seen in the action of the Social Environment as a whole on the child's mind, ideas and convictions, and in the well-known commanding influence of *collective utterance*, whether that of an excited mob or of the political party whose views are served up to its faithful adherent in his newspaper. In a secondary sense the term may, perhaps, be used, without introducing confusion, for the influence of surroundings when it takes on a semblance of the masterful force of human suggestion, as in the example supplied by Jastrow, and referred to above (p. 191, footnote 4), where the environment is strongly suggestive of an easy accomplishment of work. And it may appropriately be applied to that analogue of "auto-suggestion" which appears in the effects of preperception illustrated above (pp. 172, 173). The best attempt to bring precision into the meaning of the term is that of W. McDougall, *Social Psychology*, pp. 96 ff. One aspect of suggestion or suggestibility, namely the narrowing of the area of attention in the subject's mind—the setting up of a predisposition to entertain certain ideas to the exclusion of all others—is well brought out by Münsterberg, *Psychology and the Teacher*, pp. 177 ff. The student who reads German will find useful applications of "suggestion" to education in W. A. Lay, *Experimentelle Didaktik*, pp. 289 ff., and Meumann, *op. cit.*, i., pp. 303 ff. For an account of experiments on children's degrees of suggestibility he should consult Binet, *La Suggestibilité*, and Meumann, *loc. cit.*

CHAPTER XX.

CONCRETE MENTAL DEVELOPMENT: INDIVIDUALITY.

In the foregoing chapters we have, for reasons of convenience, dealt with the mental life in a somewhat abstract way, considering apart the three phases, intellectual process, feeling and conation. Again, in treating of development in chapter iv., we had to content ourselves with an abstract scheme of successive phases, such as sensation, perception, etc. Science necessarily concerns itself with the general forms of the phenomena it deals with. Yet it may supplement its account of these by a reference to the way in which they combine in the concrete wholes of our experience, as well as in the more important variations which these concrete wholes exhibit. Following this plan, we may well complete the theory of the general forms of mental functioning by a chapter on their concrete embodiments in the minds which we know, and on the principal differences which mark off one mind or one mental history from another. In doing this we shall not attempt the impossible feat of enumerating exhaustively all the traits which enter into a concrete human mind, but shall confine ourselves to a description of more important and *typical* characteristics.

Concrete View of Mental Life.

(*a*) **Continuity and Interaction of Mental Processes.** The consideration of mental functioning in its concrete embodiments may be introduced by an additional word on the continuity, and the interaction of part on part, of the

common course of mental experience dealt with above. The single processes, such as perception, imagination, feeling and conative effort, are not discrete events, as our way of studying them is apt to suggest to the student. Since consciousness is a "stream," there is no separation in the successive events which occur in it; the separation here, too, exists only for our thought (*cf.* p. 42). Again, with respect to the mode of occurrence of these events, it must be remembered that we have to do, not with a single series, but, as the metaphor of a stream might suggest, with a number of concurrent changes, which tend to combine with, and to modify, one another. When, for example, looking at a fifteenth-century religious painting, we have an "emotional perception," we may by reflection discover that, while processes of perception and apperception determine the feeling, the latter profoundly modifies the character of the former processes.

This interaction of the different psychical functions shows itself in a particularly striking way in the case of certain familiar mental experiences. The interaction in the complex experience of emotion has been sufficiently illustrated above (pp. 376 f.). It is no less clearly recognisable in another complex mental state, namely, Belief, which, as already pointed out, is involved in the intellectual process of Judgment (see p. 291). Now a little analysis suffices to disclose that this is much more than an intellectual process. Hume said that the difference between fiction and belief resides in "some sentiment or feeling which is annexed to the latter and not to the former." It is certainly influenced by feeling in a profound and subtle manner. Again, A. Bain and W. James have shown how large a conative element comes into most, if not into all, belief. Not only are the three great functional elements of mind present in belief, but they interact. Thus, when an agreeable idea is suggested to the mind, not only does it excite (along with feeling) a conative impulse to realise the idea, but, conversely, the disposition set up to expect and to act reacts in keeping the idea before the mind.

This influence of the conative function on belief has been specially emphasised by W. James in his well-known theory of "the will to believe".[1]

As suggested more than once above, this mutual involution and modification of processes is illustrated, not only in single experiences, but in those lengthy processes which constitute development. Although, for the sake of convenience of exposition, we have treated of the development of the processes of intellect before taking up those of feeling and conation, the actual order of events is very imperfectly represented by this plan. Not only did we find it necessary, in tracing the intellectual movement, to treat a conative factor, attention, as fundamental and necessary, also, to bring in feeling as a necessary condition of attention; but we had, towards the end of our exposition, to recognise how powerfully the higher sort of conation reacts on the intellectual and affective processes. Our common experience supplies numerous illustrations of the fact that a considerable change of feeling, such as that involved in falling in love, or in religious conversion, modifies the intellectual life, giving a new range and vivacity to the course of ideas. No less clear is the effect on intellectual activity of a masterful resolve, as when a man determines to go to college to study, or to take up literature or science as a profession (Note A).

A proper understanding of this mutual involution and modification of the mental functions will save us from serious errors in pedagogy. One of these is the naïve idea of Herbart, that since volition is a product of presentations and the feelings which arise from their interaction, the training of will and character is to be carried out largely through the education of intelligence and feeling. No such simple scheme of education is possible for one who grasps the fact of the interaction of functions. Will must

[1] On the nature of Belief see Bain, *The Emotions of the Will*, pp. 505 ff.; W. James, *Principles of Psychology*, ii., chap. xxi. (especially pp. 320 ff.), and his volume of Essays, *The Will to Believe*, etc.; Sully, *The Human Mind*, i., pp. 483 ff., and Stout, *Manual*, bk. iv. chap. viii. (*cf. Analytical Psychology*, i., chap. v., and ii., chap. xi.).

be trained in the main, not indirectly but directly, by its proper exercise in sustained effort, resistance to temptation, and so forth. It must be exercised, too, in that control of thought and feeling which has been explained above. There is a sense, indeed, in which it may be said that the exercise of a child's will is the fundamental part of all training.

(*b*) **Concrete View of Mental Development.** The more concrete idea of the mental life needs to be applied to the detailed account of early development briefly sketched in the foregoing chapters. It is not enough to say that perception, memory and the rest undergo certain changes with age; we require to know just what particular changes occur, and at what particular times, to have a detailed chronicle of what happens month after month—if not also week after week—in the early stages of development. Prof. Preyer, Miss Shinn and others have given us sketches which, so far as they represent the common course of events, are of great value in filling out the bald scheme of children's development. The closer and more methodical examination of children to-day in respect of the changes of bodily growth—including that of the brain—of motor and sensory powers, is already giving us a fuller and more detailed "story" of the child's mind. Among other important results of this research work we learn that there is a close parallelism between bodily and mental growth, that mental activity has its periodic rise and fall, that the child develops its own characteristic way of perceiving objects, and so forth.[1]

Theory of Definite Stages of Development. In this continuity of intricate changes our practical instincts cry out for landmarks. Hence, writers on child psychology, especially in Germany, have attempted to mark off distinct periods of development. This has been carried out, to some extent, by a reference to epoch-making changes—familiar to us all. Thus, Sigismund distinguishes after

[1] See Meumann's *Exper. Pädagogik*, i., 3te Vorlesung.

"the stupid quarter (of a year) of the suckling," the period from smiling to sitting up, from this to walking, from this to talking, etc.[1] The advent of puberty is a very big milestone, which no eye can miss, and the psychical *bouleversement* it is capable of effecting has had ample justice done to it by Prof. Stanley Hall.[2] But these conspicuous boundaries do not suffice for a systematic mapping out of stages of childish progress, and we find that German writers ingeniously suggest quite a number of periods characterised by certain intellectual changes. For example, in the article on "Psychische Alterstypen" in Rein's *Encyclop. Handbuch*, we have the following six periods distinguished: (1) the first three years—period of the development of the senses; (2) from the third to the seventh years—period of first stage of self-consciousness, reproduction, comparison and discrimination, imagination and thought; (3) seventh and eighth years—period of transition; (4) ninth and tenth years—period of the growth of ideas in clearness, also of memory and self-consciousness; (5) period of fuller development of thought, understanding, ordered memory; (6) the last school years.[3] As this example shows, the attempts to assign definite periods determined by the appearance of new intellectual movements are wanting in scientific precision and have an arbitrary look.

The further development of experimental investigation may, perhaps, introduce greater precision into the attempt to mark off these successive changes. More particularly, it promises to supplement the results of the careful observation of the mental development of the first three years by giving us a somewhat more definite know-

[1] Given by Ament, *Fortschritte der Kinderseelenkunde* ("Altersstufen").

[2] See his larger work, *Adolescence*.

[3] Other proposed divisions into periods are those of Hartmann (Ament, *loc. cit.*); E. L. Thorndike, *Notes on Child-Study*; W. B. Drummond, *Introduction to Child-Study*, pp. 59, 60. Meumann contents himself with naming three big periods—childhood (up to beginning of puberty), boyhood and girlhood (up to eighteen), and the period after eighteen (*Exper. Pädagogik*, i., p. 42).

ledge of the common course of mental progress in the later years, when the teacher's hand begins to control the process. Yet we must not, perhaps, look for a theory of mental progress which will detect and register all the subtle changes, now slow, now swift, which characterise the growth of a young mind. (In connection with this paragraph, see below, Appendix B.)

At its best, moreover, such a chronicle of merely intellectual progress is a one-sided affair. Our view of the connectedness of the intellectual and the other phases of the mental life requires us to insist on a record of the concurrent progress of the child's feeling and conation, and on some indication, at least, of the way in which at each successive stage the several concurrent changes are connected and tend to modify one another. The attempt to supply this more adequate concrete sketch of the child's mental history has actually been made, and with a certain degree of success.[1] The fact that this more adequate way of distinguishing periods of mental progress has fallen out of fashion points to the conclusion that we have not as yet sufficient data for constructing the more intricate kind of scheme.

Discrimination of Parts of Nature and Nurture. After what has been said above on Development (see chapter vi.), it is hardly necessary to urge that in these attempts to draw up a detailed chronicle of the changes constituting early development, a serious effort must be made to distinguish the more spontaneous appearances of new phases of tendency and grades of capacity from the effects of environmental action, more particularly that of school-training. In the new researches just referred to this distinction has not been lost sight of. Thus, in working out a theory of bodily development, attention has been paid to the effects of the beginning of school life on bodily health and growth. As is perhaps natural, the doctor and the teacher differ in the conclusions reached,

[1] *E.g.*, Pfisterer in his *Pädagogische Psychologie*, § 2. He confines himself, however, to the three longer periods, childhood, boyhood and youth.

the former regarding the change of conditions as harmful, the latter as harmless.[1] Important, too, in this connection is the prolonged series of inquiries into children's "stocks of notions" on entering school (see p. 181), since they aim at helping the teacher better to understand the pre-existing mental condition of the children whom he is called upon to instruct.

Variations of Mental Type.

How Minds Differ. We may now pass to the consideration of some of the more important variations of mental functioning which appear in different persons. These variations may affect the relative strength of different tendencies, such as keenness of perception, conative energy, emotional excitability; or may involve differences of height in the scale of intellectual and moral development. Again, they may show themselves in a more general form, as special characteristics of a sex, of a race, *e.g.*, the Celts, or of a people, *e.g.*, English or French; or, on the other hand, in an individual form, as differences marking off one Englishman or American from another. It is the latter sort of variation of mental characters in individuals which is of chief account to the educator. It is commonly dealt with under the head of "Individual Differences".

Now an individual is marked off by a large group of particular modifications of mental trait or tendency, which no analysis could succeed in separating out. Who would undertake to enumerate all the differentiating mental traits of his most intimate friend—all the peculiarities in his ways of looking at things, of drawing conclusions, of describing experiences, etc., not to speak of peculiarities in ways of feeling and acting? All that psychology can attempt here is to bring out some of the more important and fundamental points of difference. This means a

[1] See Meumann, *op. cit.*, i., p. 53 ff.

grouping of individuals *according to type*, the type being determined by the prominence of some recurring form in an important mental trait, *e.g.*, the employment of a particular kind of image, as visual or motor. Much of recent investigation in this field illustrates the use of the conception of type. Thus we find that there are different types of perception, of judgment, etc., and that a given individual may illustrate a number of these types.

As in the development of a bodily organism, so in that of a mind or personality, individual differentiation progresses as the years advance. The child of six is more of an individual, both in his bodily conformation and facial features, and in his mental traits, than an infant; the boy or girl of twelve, than the child, and so on. Some differences, however, exist from the first, and the peculiarities of mind and character with which everyday experience familiarises us have their congenital basis in those tendencies to individual variation already noticed (see pp. 62, 77). Differences in mental capacity of various kinds appear in the early years, and must to some extent be regarded as congenital.

Recent Studies of Character. The fact that individual differences appear on a larger scale in maturity naturally led inquirers to study them first of all in the adult. The old doctrine of temperaments was intended to be a theory of the psycho-physical basis of the broader differences of type as fully revealed in the mature character. Although, owing to the backward state of physiology, the distinctions drawn between the "sanguine" and the other temperaments appear to us of to-day crude enough,[1] these early explorers in the dark region of human temperament saw certain facts with great clearness, as is shown in the repeated attempts in recent times to translate their distinctions into terms of modern science. More particularly,

[1] The "us," I find, must be qualified. Prof. McCunn thinks it worth while to dish up in a somewhat indigestible form the doctrine of temperaments in a book otherwise in many ways suggestive. (*The Making of Character*, chapter iii.) *Cf.* Keatinge's *Suggestion in Education*, chapter vii.

they discerned the profound influence of the cœnaesthesis, that is, the dim region of organic sensation, on character.

Later writers, aided by a better psychology, and by a better physiology, have made valuable suggestions as to the more important typical varieties of character, and as to the fundamental differences—both in the underlying nervous processes and in the correlated psychical tendencies—which determine them. This is not the place to enter more fully into these studies. It must suffice to point out that they show a growing appreciation of the complexity of a mature personality. The later works, including some suggestive French studies, have gone beyond the crude device of referring all the mental differences between one person and another to a preponderance, now of the intellectual, now of the emotional, and now of the volitional factor. What determines a particular type of person is always a certain group of tendencies, involving special modifications alike of feeling, of thought, and of volition. Thus, a poet is distinguished from a thinker and from a man of practical genius by a modification of the whole of the intellectual activity, by the predominance of a certain mode of feeling, and by a correlative modification of the type of volition. Again, a passionate lyrical poet is differentiated from a calmer, reflective one, by a further differencing and organising of the three great mental constituents. Another valuable feature in these recent studies is the space given to the physiological basis of character-type, including peculiarities in mode of functioning of the nervous system as well as of the connected organs (Note B).

Although they are studies of developed character, these works are valuable for the teacher in two ways. In the first place, they probe the congenital roots of mental differences, and so assist in the study of the less clearly marked differential characteristics of children. In the second place, they deal with personality as a whole, with the organised group of tendencies which characterises this or that sort of person.

Typical Diversities of Mental Functioning. From

these studies on groups of distinctive characteristics we have to distinguish inquiries into variations in particular modes of mental functioning, *e.g.*, attention, discrimination, emotional reaction. In this more analytic or abstract kind of investigation we leave for the most part out of account the total group of characteristics which constitutes the person dealt with: we regard him for the moment merely as a discriminator of tones or other sensations, as an emotional reagent or what not, our object being to know in what typical manner he carries out the particular process investigated. It is thus greatly restricted in its range, and is apt to wear an artificial and piece-meal look. At the same time it illustrates the method of mastery by dividing, since it offers definite lines of inquiry which promise certain results.

As repeatedly suggested in this work, all the mental processes, while similar in their general features, vary within certain limits in their particular forms. Thus if, keeping to intellectual processes, we consider an elementary function, *e.g.*, discrimination, we find that it varies in certain ways. Even the same individual may have a relatively high discrimination for one class of sensations, *e.g.*, colours, and a relatively low discrimination for another, *e.g.*, tones; and if we compare different individuals we find that they vary greatly in their discrimination of this, that and the other group of sensations. Similarly in the case of simple memory-processes, of attention, and of other processes which may be regarded as relatively simple constituents of intellectual activity.

These differences were known, to some extent, by the older psychology, some psychologists devoting considerable space to the description of them. The reference to them grew, indeed, out of that more elaborate kind of descriptive psychology which pushes behind such names as "attention" and "memory" and investigates analytically the several distinguishable elements in the process so named, and the several ways in which their forms may vary. Thus, in the attempt to analyse memory-processes and to

define what we mean by a comprehensive, an accurate or trustworthy, and a ready memory, the investigator found it necessary to illustrate his points by a reference to commonly recognised differences between one person's memory and another's.

Experimental Investigation of Individual Differences: Nature of Investigations. The knowledge of mental differences obtainable by this introspective analysis is, however, limited. The introduction of experiment into certain parts of this psychological field has enlarged our knowledge of such differences and rendered them more precise. It is to be noted that experimental work was not undertaken for the purpose of elucidating individual differences. It so happened, however, that the kind of work which the experimenter was obliged by the conditions of his research to select was excellently suited to force these differences on his notice.[1] A psychological experiment aims at calling out from the "subject" some reaction in response to a stimulus under carefully prearranged conditions, and determining how the character of the reaction is modified when the conditions are varied in certain ways. Thus in reaction-time experiments the subject has to carry out a certain manual movement the very instant he hears a sound or sees some visual object (see p. 177). The first experiments of Lange disclosed the fact that the reaction-time was shortened when the expectant attention, instead of being focussed on the sensory stimulus, was directed to the movement. It seemed reasonable that this should be so, since this mode of preadjustment brings the subject a stage nearer to the actual execution of the movement. A theory of two contrasted types, motor and sensory, grew out of these researches, it being supposed that some persons were habitually "motor" or short-timed reagents, others "sensory" or long-timed reagents. Later investigations, however, have thrown doubt on this simple theory

[1] Even then, however, he was so little interested in them that he regarded them as errors to be got rid of or allowed for (*cf.* Meumann, i., p. 326).

of two types of reagent. It would appear from these that preadjustment of attention to the movement does not, in all cases alike, shorten the time. There are considerable typical differences here, one person's reaction being shorter when attention is directed to the movement, another's when directed to the stimulus. The difference between the sensory and the motor type has in this way acquired a deeper significance, as showing that certain individuals find one way of reacting, others another way, the more advantageous. It may be added that, according to Flournoy, the sensory and the motor are not the only types of reaction. He distinguishes two other types, namely the Central and the Indifferent. In the former the reaction is most rapid when the attention is directed to the whole process, the stimulus and the movement in their connection, while in the latter the particular mode of preadjustment makes no difference in the result.[1]

The student might naturally suppose that differences in respect of time-lengths so small as those measured in these experiments—where a second counts as a very long interval—can have but little to do with the more palpable differences of memory and other mental processes just referred to. He must remember, however, that the temporal relations of psycho-physical processes are probably a fundamental trait in mental character, and one of capital importance in determining personal type. These temporal relations are, indeed, hinted at in the description of temperaments by the old writers—*e.g.*, in the contrast of the sanguine and phlegmatic type,—and have been made a fundamental factor in character-types by the French writers alluded to above. But, further, accuracy of measurement is of the first consequence in investigating such temporal relations; and this accuracy is secured by the special apparatus used in these experiments. We see indeed a tendency in the new treatment of individual differences to erect this contrast

[1] Stern, *op. cit.*, chap. xl., "On Reaction-Time Experiments". See C. S. Myers, *Text-book of Experimental Psychology*, chap. xi.

between the sensory and motor form of reaction into a basis of character-differences.

Recent Extension of Investigations. The more exact investigation of individual differences illustrated in these reaction-time experiments has been greatly extended during recent years. The experimental psychologist has grown more interested in these differences and given a fuller account of them. The pedagogist, too, has grown experimental, and while, like the psychologist, primarily concerned to get general results, has opened up promising lines of inquiry into individual differences. As might be expected, his inquiries have been directed more especially to ascertaining the mental differences of children, and to finding suitable methods of testing the several capacities on which the teacher has to act. As a result, we have already some amount of material for the construction of a scientific theory of individual mental traits and for the application of the theory to education. The publication of such a work as that of Prof. Stern on the subject may be said to mark an epoch in the development of this important branch of applied psychology.

Measurement of Differences of Nervous Energy. Only a short sketch of this new kind of investigation can be given here. To begin with, it links itself on to that more scientific mode of determining the bodily characteristics of children which is destined to do so much for the health and efficiency of the school of the future. Within the limits of what we call the normal child, there are many and important variations in bodily vigour, in modes of nervous functioning, in liability to mental fatigue, as well as in the general course of bodily development, about which every teacher, guided by the specialist, should know something. These facts point to the desirability of carrying out a systematic anthropometric measurement of the successive phases of bodily growth in the individual child, of a periodical testing of his motor and sensory powers, as well as of his nervous energy (so far as this is possible), and of a careful record of any fluctua-

tions in nervous tone and liability to mental fatigue in different parts of the day and different seasons of the year. The investigations along these lines already carried out have disclosed some interesting facts, for example, the typical difference, noted by Kraepelin, between the "morning worker" and the "evening worker".[1]

Testing of Sense-capacities. In close connection with this inquiry into the physiological conditions of mental work in the individual, there can now be carried out a methodical testing of sensory abilities. The individual differences of sense-capacity to be noted will include the two aspects of sensibility, namely, acuity (or absolute sensibility) and fineness of discriminative sensibility —the latter applying to intensity, quality, and local differences of sensation. These several modes must be separately tested in the case of each of the senses. In this way we may know, for example, a particular child's range of sense-experience in the case of colours, of tones, etc.[2]

The measurement of the simpler forms of sense-capacity is easy, illustrating, in a striking way, the suitability of psychological experiment for educational purposes. As to the precise value of the results reached by such measurements, opinions differ. Some recent authorities—for example, Stern—regard these measurements as having but little significance for individual and even for general psychology. Stern thinks, too, that a large part of the differences of sensibility observed among individuals is due, not to congenital causes but to differences in practice.[3]

Differences in Intellectual Processes: (1) Attention. Coming to intellectual processes, we find that in the case of attention several modes of variation have been distinguished answering to different aspects of the activity already touched

[1] See Meumann, *op. cit.*, i., pp. 343 ff. *Cf.* R. McDougall, *Psychological Review*, 1899, pp. 203 ff., where four types are distinguished according to variations in the curve of work; also Lay, *Exper. Didaktik*, pp. 453, 454.

[2] On the methodical measurement of degrees of sensibility in the several senses, see Ch. S. Myers, *Text-book of Experimental Psychology*, chap. xviii.

[3] *Op. cit.*, p. 43; but compare Meumann, *op. cit.*, i., pp. 339, 340.

on. Of these, one very important point of difference is supplied by the distinction between mobility or attractability and resistance to stimuli. In the case of the well-balanced mind these present themselves as alertness *and* concentration, according as the new stimulus, or the one already at work, is the more important (see p. 144). But in certain types of child there is a relative lack of one or the other, as when deficient alertness leads to an undue fixity of idea tending in the abnormal direction of *idées fixes;* or when, on the other hand, a child's attention slips from one thing to another without any reference to a connection between them, or to any guiding interest or purpose. Such extreme variations are often the first signs of incipient mental disease.[1] The capacity of attention varies in other ways, too; for example, in the area or "span," that is the number of elements, simultaneous or successive, which can be attended to as a single object, and in rapidity of accommodation to unfamiliar forms of presentation. In this case, too, the significance of the facts ascertained is variously estimated. Thus, mobility, as tested by susceptibility to distracting sounds, etc., is regarded by Kraepelin merely as a weakness, while Stern thinks that it has its own value.[2] It needs hardly to be added that the testing of a particular child's attention connects itself very closely with the measurement of his nervous energy and capacity for work.

(2) **Differences in Perception and Apperception.** That there are individual differences in perceptual capacity and mode of apperception has been suggested above. The simplest way, says Stern, of investigating types of perception (or "Anschauung") is probably the examination of the strength and certainty with which a definite group of sense-presentations can be reproduced immediately afterwards (*cf.* above, p 237). Some recent experiments suggest that in the perception of movements by the eye

[1] Prof. T. Ziehen, art. "Diagnose psychischer Erkrankungen" in Rein's *Encyclop. Handbuch.*

[2] See Stern, *op. cit.*, pp. 78, 79.

some persons attend more to the temporal, others more to the spatial, element or aspect.[1] It would be interesting to know whether this points to a wider contrast of type, which would cover the disposition of certain persons when æsthetically contemplating still forms, *e.g.*, a church spire, to translate the lines into movements or tendencies to movements.[2]

Coming now to the apperceptual aspect of perception, we shall expect to find that in different groups of individuals there are characteristic differences in respect of point of view and mode of interpretation (see pp. 146, 190). The earliest experiments on this aspect of individual variation were those of A. Binet. He took as his subjects children between the ages of eight and fourteen from elementary schools. A picture was shown to them of a workman lying on his death-bed and making known to his sons his last wishes. After looking at the picture for two minutes they were required to describe it in ten minutes. From the descriptions received Binet inferred the existence of four distinct types of observation or apperception—(1) the Descriptive type which simply describes what is seen; (2) the Observant or Integrative type ("type observateur") which expands, adds detail to, and makes a larger whole out of, what is seen; (3) the Emotional type, which dwells on the feelings manifested or suggested by the picture; and (4) the Learned type, which substitutes for what is presented a mass of knowledge already possessed. These types, though interesting, are not as well defined as they might be, and they certainly fail to give a complete scheme of the differences in our familiar modes of apperception.[3]

(3) Variations of Reproductive Process. Our know-

[1] Meumann, *op. cit.*, i., 422.

[2] This tendency has been regarded by Lipps and others as common and essential in all æsthetic contemplation of forms. (See the article in the *Edinburgh Review*, referred to above.)

[3] Binet's experiments are described in his journal *L'Année Psychologique*, iii. (1897), pp. 314 ff., and in *L'Étude Experimentale de l'Intelligence*, pp. 190 ff.; *cf.* Meumann, *op. cit.*, i., pp. 429 ff.

ledge of individual differences in the reproductive processes is considerable, and recent experiments on simple forms of memory, on association and on predominant types of image have made the knowledge fuller and more precise. Since the basis of memory is the revival of the sensations of the several senses, the investigation of individual differences in reproductive power naturally begins with the examination of the comparative strength, distinctness and stability of the images corresponding to visual, auditory and other sense-presentations. Common observation tells us that one boy may best recall one kind of sense-impression, say colours or visual forms, another, another kind, *e.g.*, tones or motor experiences. The experimental work on immediate memory confirms this everyday observation. Individual reproductive power shows a strong tendency to specialisation. Thus we cannot tell from the ability which a person shows in retaining figures what his capacity will be for retaining (under similar conditions) meaningless words.[1] These special facilities in retaining a certain kind of sense-material are important as suggesting later careers. A particularly strong retentive bent for colours or tones is known to be an important constituent in the talent of the painter or musician. Yet it would be rash to determine a boy's career merely by a reference to what has been called sense-memory. In this connection, it would seem to be necessary to determine how far this specialisation of sense-memory is congenitally determined, how far a derivative characteristic resulting from such congenitally determined traits as a particular vividness of colour or tone impressions combined with a corresponding degree of intensity in the accompanying pleasure, which would lead to a special interest in them.

But mental reproduction varies from child to child in respect not only of sensuous material but of form. The experiments on association referred to above have brought out the fact that certain predominant directions of sugges-

[1] Thorndike *Educational Psychology*, p. 29 : *cf.* above, p. 239.

tion characterise different individuals. We all know the difference between the kind of mind which moves habitually along lines of contiguity, going from one detail to another disconnected one, and that which moves from one idea to another related to it by similarity or causal connection. According to Binet,[1] the "type observateur" is characterised by richness and predominance of contiguous or "external" associations as distinguished from the "internal" associations which rest on similarity. The specialisation of the reproductive dispositions may go further than this, showing itself as a predominance of a particular mode (of contiguous) association, *e.g.*, *spatial* contiguity (see p. 207). Attempts have been made to classify types of association, *e.g.*, as logical, passing from fact to cause or reason; as co-ordinate, from the name of one species to that of a co-ordinate species; as subordinate, from species to genus, and so on. But, as Stern remarks, the real processes of associative suggestion are far too subtle and complicated to be thus classified. He adds that the processes under the experimental conditions—of having to say what associations are first called up by a particular word—are far too artificial and different from those of our everyday reproductions to be a test of the latter.[2]

Individual differences disclose themselves in other aspects of the reproductive process. Time-relations are important here also. There is the type of child that learns quickly and forgets quickly, and the type which learns slowly and retains well. Again, the reproductive power is apt to be slower in the case of some children than in that of others. In the experiments referred to, there are noteworthy differences in the degree of precipitancy of the movement from the given word to some associated element. Memories differ, too, in respect of the precision and accuracy of the ideas recalled, of orderliness of arrangement or systematisation, and of readiness in reproduction. According to Thorndike, the differ-

[1] *L'Étude Exper. de l'Intelligence.*
[2] *Op. cit.*, "Association".

ences between ordinary and defective children, and between bright and dull children, in the degrees in which their ideas are grouped into systems, are very great, and afford a particularly good test of ability.[1] Further experiments are needed for showing how these several modes of variation are related one to the other.

(4) **Differences in Imaginative Activity.** We may now pass to differences in the form of imaginative activity. Here we have at the outset the important differences depending on the *predominant type of image*. An examination into the way in which a person habitually images a word disclosed the fact that there are three types of imager: (1) the "visual," who represents words as visual symbols, (2) the "audile," who represents them as articulate words, and (3) the "motile," who represents them as motor experiences (*cf.* p. 199). The discovery has been confirmed by later observations, and constitutes one of the most interesting of the results of the new experimental work in psychology. The distinguishing of these imaginative types is, moreover, of practical value, since in education we need to know just how a child carries out this and that mental process. But until it is shown that the differences referred to involve other and more important differences they can hardly be said to have the importance which some claim for them.[2] Educational writers, not unnaturally perhaps, have looked to this discovery as supplying a new ground of classification, some going so far as to say that the visuals, audiles and motiles should be put into separate classes. Happily, so hasty and foolish an attempt to give practical application to a psychological theory is frustrated at the outset by the circumstance that the large majority of children turn out to be of a "mixed type," being, for example, visual for *things*, but to some extent audile and motile (as well as visual) for *words*.[3]

[1] *Notes on Child-Study*, p. 88.

[2] Meumann thinks it worth while to devote over sixty pages (i., pp. 435-498) to the subject, while Stern has no section on it—so differently is its educational importance estimated.

[3] Meumann, *op. cit.*, i., pp. 493 ff.

It seems very doubtful whether the difference in the way of imagining words in motor or sensory terms coincides with the distinction between the sensory and the motor type brought out in reaction experiments.[1]

Recent research has done little towards elucidating other differences in children's imaginative activity. It is probable that in the more spontaneous productive forms, as illustrated in play, etc., there are (as in the case of reproduction) preferences for certain kinds of sense-material. In this case, too, we may note formal differences, as illustrated, for example, in a preponderant turn, now for spatial construction—descriptions of objects, places, etc.; now for temporal construction—narration of stories. We might, perhaps, test constructive power—of a special kind at least—by such a method as that used by Ebbinghaus in testing capacity for combination (by filling in missing words and syllables in a piece of prose). Yet the high degree of intelligence required for this work would seem to make the method less suitable as a test of children's purely imaginative activity. Some modification of Binet's device of getting a description written seems to promise better results in this case.

(5) Differences in Mode of Thought. In investigating thought, too, we may, to some extent, call in the aid of experiment. Interesting lines of work have been opened up in estimating, with some precision, characteristic differences in children's ways of judging. In experiments on sense-discrimination noteworthy differences appeared in respect of *decision* of judgment, some being uncertain, others more decided.[2] Of great importance here is the attempt to compare children in respect of their degree of *Suggestibility*, and of the degree of trustworthiness of their judgments as affected by this. While children in general are found to be highly susceptible to the effect of suggestion, important differences occur. In experimenting with an

[1] See Stern, *op. cit.*, p. 105.

[2] See Stern, *op. cit.*, ch. x., *e.g.*, Meumann, *op. cit.*, i., pp. 348 ff.

instrument by which gradual change of pitch of tone could be produced with varying speed, the subjects being required to react when they noticed a difference, two types revealed themselves: (1) the "subjective," which reacts quickly and confidently, making many mistakes, and (2) the "objective," which is slower, more cautious and more correct.[1]

Among lines of inquiry which throw light upon differences in thought-capacity a special value attaches to the careful records of children's vocabularies, as well as of the gradual expansion of these at different ages, together with the early development of sentence-building. Differences of intelligence show themselves in the fulness and rapidity of growth of these lingual capacities. With these records may be taken differences in the stocks of notions already referred to. As might be expected, the differences observable here connect themselves closely with differences in environment, home-culture, etc.[2]

Differences in Feeling. Common observation detects well-marked differences in respect of *feeling*. Some children require stronger æsthetic stimuli than others before they find certain combinations of form-elements or colours pleasing or displeasing. Again, children differ manifestly in the quickness of their affective reactions, and in the range and energy of their emotional expressions, some, for example, responding quickly but showing but little persistence of feeling, while others who respond slowly with only feeble outward expression, are apt to prolong their feeling by nursing it inwardly. These differences are recognised in the attempts to classify temperaments and characters already referred to. There are, further, noticeable differences with respect to the special kind of stimulus which calls forth the most lively pleasure

[1] See Stern, *op. cit.*, ch. x., *e.g.*, Meumann, *op. cit.*, i., pp. 348 ff.

[2] On children's language see *Studies of Childhood*, ch. x.; Ament, *Die Entwickelung von Sprechen und Denken beim Kinde*; Tracy-Stimpfl, *Psychologie der Kindheit*, v. Kap. Binet gives an interesting comparison of the language and the modes of thought reflected in the attainments of his two girl-subjects in *L'Étude Experimentale de l'Intelligence*.

and displeasure.[1] The varying directions of children's affective tendencies are illustrated also in the study of their interests already touched on (see p. 136). Yet it cannot be said that experimental inquiry has done much to clear up what is the most elusive side of the elusive subject of individuality.[2]

Differences in the Conative Processes. Here, again, everyday observation discloses a number of well-marked differences, such as that between the impulsive, quickly reacting type, in which impulse predominates over inhibition, and the type marked by slow and feeble reaction, due to deficiency of impulse or excess of inhibition.[3]

Light has been thrown by recent investigations on differences of conative tendency among children. Quickness and slowness in motor reaction and in new motor adjustments undoubtedly count here as variable characteristics. So, again, do differences in degree of *suggestibility* which are related to the important difference between the self-reliant, and the more dependent and submissive, type of child. The difference between the child who is energetic and persistent in effort and the one whose effort is quickly inhibited by a sudden oncoming of discouragement and self-distrust, is one of the familiar contrasts of the nursery and school-room. With respect to the higher volitional processes, too, the more complicated sort of reaction-experiment has given some precision to our knowledge of the simpler kinds of difference in respect of deliberation and choice.[4]

Results of Recent Investigation: Differences between Boys and Girls. It would be quite as easy to underestimate as to overestimate the results of the many lines of recent inquiry which have more or less of the strictly experimental character. Something has been done, at least, to determine the range of individual variation, also to de-

[1] See Meumann, *op. cit.*, i., pp. 341, 342.
[2] See Stern, *op. cit.*, chap. xii.
[3] See W. James, *Psychology*, pp. 437 ff.
[4] See Wundt, *Outlines of Psychology*, § 14 (pp. 201 ff.); Judd, *Psychology: Gen. Introduction*, pp. 333 ff.

fine the average type of special discriminator, memoriser, etc., and to show how deviations from the average decrease in number as we move farther from it.[1]

One interesting result is the determination of certain points of difference between boys and girls. Greater variations from the average of capacity are said to occur in the case of boys than in that of girls. Thorndike gives tables which go to show that, though girls surpass boys in delicacy of sense-discrimination and in shortness of reaction-time, they fall below them in tests of perception, memory of unrelated words, association and conceptual processes.[2] Lay, who experimented with Ebbinghaus's combination-method, found that in the lower classes, without exception, girls are inferior to boys. The differences in respect of æsthetic preferences referred to above (page 392) point to a similar conclusion. There is much to suggest here that the typical course of bodily and mental development is a different one in the case of boys and of girls. More special differences disclose themselves also. Thus boys are said by one worker to have stronger memory for concrete ("*reelle*") impressions, girls for numbers and words.[3] Differences between the two sexes appear, further, in the choice of ideals, girls being said to go for these more to the persons in their familiar world, boys more to public and historic characters.[4] Girls are said by the same authority to be more suggestible than boys. These and other differences ascertained cannot be regarded as indicating differences of congenital tendency, since they are what one might have expected from the known differences in the mode of life and training of girls and boys in the early years.

Estimate of Results of Experiments. With respect to individual variations, the result of these inquiries has been to deepen the sense of the *number of differences* be-

[1] See Thorndike, *Educational Psychology*, chap. iii.
[2] *Notes on Child-Study*, "General Mental Development".
[3] Barth, *Erziehungs- und Unterrichtslehre*, p. 45.
[4] Meumann, *op. cit.*, i., 295.

tween children. More particularly the discovery of clearly marked types of perceptual and imaginative activity, of decision in judgment, of motor reaction, etc., constitutes a real addition to our knowledge of variable characteristics in children.

On the other hand, it must strike a thoughtful student that a good deal of the experimenting hardly seems to concern itself with differences in fundamental and important modes of capacity. It rather resembles that testing of scrappy and highly restricted forms of ability which was, and still is, a popular recreation, as illustrated in "spelling-bees," "Limericks," etc. How far, one cannot help asking, does this testing of skill in holding for a short time a string of meaningless sounds, or in supplying missing words and syllables, penetrate into the deeper-lying functional activities and tendencies of a child's mind? We must remember that in spite of the large number of psychological laboratories now at work, and of the praiseworthy ingenuity shown by their directors, the range of experimental investigation in psychology—relatively to that of psychological inquiry as a whole—is still an exceedingly small one. Owing to the conditions required for exact experiment, it has, for the most part, to do with very simple and abstract types of process, which are not only not representative of our more concrete and familiar modes of mental activity, but stand in no obvious relation to them, and which, accordingly, wear to the bystander the look of being highly artificial and invented for the purpose of experiment. It is enough to refer to those experiments on association which require the subject to take up a difficult introspective attitude—that of looking out for the first idea which turns up in his mind when, say, a particular word is presented to him.

The restricted range and highly artificial character of these experiments has led the bolder kind of experimenter to adopt a new way of conceiving of mental activity. From the laboratory point of view, a child's mind is apt to appear, not as an organised complex whole, made up

of related forms of intelligence, etc., but as a bundle of isolated potentialities for acquiring readiness in performing what to the outsider look like highly specialised knacks. In this way laboratory psychology has shown a tendency to go far beyond the faculty-view in its atomistic tendency to resolve mental processes into an aggregation of disconnected forms (Note C).

The Fuller Study of the Individual.

Need of Further Investigation: (*a*) More Complete and Systematic Testing of Mental Processes of the Individual. In order that much of the new experimental work may become of real use to the teacher—or even to the general psychologist—it must be supplemented by other work of a more comprehensive kind. To begin with, there needs to be carried out a much more careful analysis of the particular processes dealt with than is often found in records of experiments. Thus, it is important to render precise the part played by a particular direction of attention, *e.g.*, visual, auditory, in the kind of process dealt with.

Now a more thorough analysis of the results of testing individual differences will necessitate much more of co-operation and co-ordination of results among workers: experiments will need to be varied so as to cover as many varieties of process as possible. Not only so, the same children require to be experimentally examined on as many different sides of their mind as possible. Only in this way shall we be in a position to reach a complete analysis even of comparatively simple-looking results. Thus, only after we have determined in the case of a given child the strength and prominence of the several aspects of attention noted above, shall we be in a position to assign the proper value to this factor in any particular line of experimental inquiry which we carry out into his mental processes.[1]

[1] Meumann connects certain properties of attention with apperceptual types, *op. cit.*, i., 516.

This systematic many-sidedness in testing a child's mind is needed, too, in order to distinguish what is fundamental and elementary from what is dependent on this. We may instance the point whether, with Prof. Bain, we make a particular preponderant direction of sense-discrimination fundamental, and regard the corresponding kind of sense-memory as dependent on this, or whether, with Meumann, we view the latter as a new and largely independent element of difference.[1]

(*b*) **Inquiry into Correlations: General and Special Memory.** Another desirable result of a more systematic extension of psychological, as well as of the new pedagogic, experiments is to show how far *correlations* exist between one kind of process and another. What, for example, is the relation between the readiness shown by a given child, in carrying out a particular piece of perceptual or mnemonic work, to his general readiness in perception or memorising? This question has been much discussed in connection with Memory.

The question has assumed two forms: (*a*) it was first asked what is the precise relation of the Special Memory or Memories to the General Memory of an individual (see p. 231); and, more particularly, how far the exercise and improvement of the memory for a particular kind of material, *e.g.*, non-significant syllables, tends to improve the memory for other kinds, say, numbers. This question, as we have seen, has been answered in different ways (see p. 238).

(*b*) More recently, it has been asserted—*e.g.*, by Binet and Henri, and later by Thorndike—that we cannot speak of A's or B's General Memory, that is to say, a general high or low level of memory-power, but that every person's so-called memory is a congeries of disconnected special functions; from which it follows that the testing of one of these is practically useless for telling us anything about the other.

[1] This seems to be Meumann's view. See *op. cit.*, i., p. 423.

It is certain that special memories exist in all individuals after a certain age has been reached. Whether these, *e.g.*, that of the painter, are original, involving special congenital characteristics of the corresponding cortical region, is doubtful. A specially keen sensibility to the pleasurable effects of colours or of tones, together with the greater attention and practice in observation which would follow from this, might probably explain all. Mental pathology shows us how relatively independent such developed special memories may become, as when the disappearance in loss of memory (amnesia) of a certain class of words leaves the other classes intact. Yet these facts do not affect the question whether a given individual possesses in the congenital arrangements of his nervous system the basis of a certain amount of general retentive power. Indeed, those who, like Prof. Bain and Prof. James, emphasise the non-improvability of memory as a whole, appear not only to allow but to insist upon this. These opposed views clearly point to the need of repeating and varying the experiments already made. Meanwhile, one may point out that all we know of the way in which the central nervous system is built up, and of the differences in its structure and mode of functioning in lower and higher racial types, suggests that to the difference between the brighter and duller sort of children there corresponds some difference of quality in the nervous groundwork of retentiveness *as a whole*. Not only so, psychological analysis tells us that the particular sense-material involved cannot be the all-determining factor in memory. The ability to retain and to recall any class of impressions implies certain formal conditions, such as a methodical control of the attention and a systematising of the material, which are valid for all varieties of material, and would of themselves constitute an important factor in general memory (compare above, p. 239).

Analytic and Synthetic Investigation of Individual Mind.

Relation of Special Abilities to General Ability. The great limitation to the experimental testing of an individual child's mind is the fact—so strangely ignored by some experimenters—that this mind is a complex unity in which each particular tendency is modified by the whole group of tendencies to which it belongs. As Prof. W. James has it, "man is too complex a being for light to be thrown on his real efficiency by measuring any one mental faculty *taken apart from its consensus in the working whole*".[1] It is this limitation which gives force to the objection of Prof. Münsterberg that psychology—*i.e.*, experimental psychology—is of but little use to the teacher (*cf.* above, p. 15). The recognition of this limitation should lead those who experiment on the minds of individual children to work in close co-operation with the schoolmaster. They should do this, first of all, in order to compare the results of their tests with the status of the child in the school, and with the opinion of the schoolmaster as to the kinds and amounts of capacity he possesses.

The recent experimental work carried out on individual variations of ability of various kinds has been aided, and its results made more valuable, by the co-operation just referred to. Experimental pedagogy, assisted by experimental psychology, seems in a fair way to reach a theory of mental ability as the schoolmaster understands it, namely, as power of application and intellectual ability of various kinds. In this larger inquiry, again, the interesting point —after we have determined the several factors in a child's ability, power of attention, observation, memory, etc.—is how far these special directions of ability are correlated. Even in this age of scholastic specialisation the school talks of a boy's "general ability" and "general intelli-

[1] *Talks to Teachers*, p. 134. The italics are not in the original.

gence". The work of determining experimentally what are these wider correlations, and whether there are any scientific grounds for speaking of a boy's general intelligence, has begun and promises well, though it does not as yet carry us far on our road. One surprising result reached by some experimenters is that quite a number of dissimilar special tests, such as mnemonic and "combination" work, serve, almost equally well, as clues to general ability. This conclusion, however, is not accepted by all workers.[1] If confirmed by later experiments, it would supply a refutation of the view that these varieties of work employ isolated mental functions each of which is only slightly, if at all, related to other functions. Finally, it may be pointed out that an important part of a complete theory of ability would be the determination of the best methods of distinguishing natural ability from the effect of special practice.[2]

The Scale of Normal Ability and Abnormal Deviations. A completed theory of general ability will enable us to construct a *scale of intelligence*, and so to distinguish with more precision not merely one boy's work from another's, but normal from abnormal variations in degree of intelligence. Thus, we shall be able to say with more definiteness what distinguishes exceptional from ordinary minds; how, at one end of the normal scale, we are to draw the line between slow and backward children and defective children, and, at the other extreme, between bright and clever, and exceptionally endowed children. Yet in constructing a theory of ability we must ever keep the eye focussed for qualitative, as well as for quantitative, variations, that is to say, for the varying predominance, now of one trait or group of traits, now of another. A boy's intellectual ability shows a tendency to be unequal in different directions, being high, for example, in carrying out the

[1] See, in addition to the references already given, W. C. Bagley, *The Educative Process*, pt. v., chap. xiii., and an article by Thorndike in *The American Journal of Psychology*, July, 1909.

[2] Some good suggestions are to be found in Meumann, i., pp. 372 ff.

more exact reasoning processes of geometry, but comparatively low in a good deal of memory work.[1]

These qualitative variations are illustrated, too, in deviations from the normal type of mind. What is commonly understood by an abnormal mental type is not so much the falling of mental ability as a whole outside the limits of the normal scale—whether above or below it—but a disturbance of the normal balance of the several mental tendencies; as when, through an undue exaltation of certain imaginative and closely correlated emotional tendencies, there shows itself a disposition to develop illusions other than the common, normal ones, and even hallucinations (see below, Note D); or a morbid tendency to falsify in statement (see above p. 270);[2] or fixed delusions about self or others of a distinctly morbid tinge.

It is much the same with disturbances in the processes of feeling and conation. For example, we may find in some boys a kind of hypertrophy of the painful, as distinguished from the pleasurable side of feeling, and of the gloomy ideas growing out of this; in other boys, the opposite of this, namely, an exaggerated degree of gaiety and hopefulness to the foolish disregard of the monitory voice of pain. Similarly, in respect of conation, we meet with abnormal tendencies answering to the undue exaggeration now of the impulsive, and now of the inhibitory tendency referred to above.[3] Even great mental power, when it exists in the kind of temperament not uncommon with poets and other men of genius, may take on extravagant and quasi-abnormal forms of activity.

Study of Concrete Individuality. The attempt to establish relations between this and that mental process is a beginning in supplementing the analytic and laboratory view of a child's mind by a synthetic or more organic view. There is no reason why the methodical

[1] Meumann, in the work so often quoted, has developed an elaborate theory of ability. See Band I., Neunte and Zehnte Vorlesungen.

[2] See Tracy-Stimpfl, *op. cit.*, pp. 149 ff.; Meumann, i., pp. 248 ff.

[3] See W. James, *Psychology*, pp. 436 ff.; Royce, *Outlines of Psychology*, pp. 374 f., and Ribot, *Diseases of the Will*.

examination of children's minds now carried on should not embrace a fuller synthetic view of the individual mind. Binet has made a worthy beginning in this direction in his interesting comparative study of two young sisters.[1] In order to get a true idea of a child's rudimentary personality or character we must have resort to other sources of information than the new experimental inquiry. This may no doubt give us a momentary glimpse of other than intellectual characteristics; for, as we have seen, peculiarities of conative tendency—if not also of feeling—intrude themselves to some extent into all kinds of mental work. Yet this is not enough. The teacher who desires to understand his individual boys as concrete wholes may do worse than dip into such works as those on character referred to earlier in the chapter. This will at least teach him how complex a thing is a human mind, even in the early stages of development, and how intricately the several characteristic tendencies are interwoven one with another. With some general knowledge thus reached, he will, if he is wise, make as careful a study as circumstances permit of each of his boys. In this investigation he will direct his attention not merely to intellectual peculiarities, but to special characteristics of feeling and volition, as illustrated above. Just as keenly, too, will he be on the look-out for any indications of worthy special tendencies, of rudimentary traits or groups of traits which have special value as promising for their possessor the stamp of individuality, and of what we call distinction.

Teachers are apt, and they have many valid excuses to urge, to read their general formula of work as "*Typical development* in a new individual" instead of "Typical development *in a new individual*". Yet, though the levelling tendencies of the hour, both within and without the school, are powerful enough, the school will lose its title of humaniser if it does not make a fight for that precious thing, individuality, for which, among others,

[1] *L'Etude Expérimentelle de l'Intelligence.*

some of our own great writers have pleaded, and upon the cultivation of which by the educator the Herbartians have so worthily insisted. Perhaps it is hardly less necessary to-day than it was just fifty years ago, when J. S. Mill published his essay, *On Liberty*, to urge the claims of a full development of what is good in the individual's special and distinguishing group of capacities and tendencies. An adequate realisation of individuality is most obviously a good for the individual himself, as giving completeness to self-realisation, as guaranteeing to him a chief constituent in the higher kind of happiness, namely, the consciousness of being something, of having thoughts, tastes and aims which are his own and not a mere reflection of the predominant patterns of the hour. Hardly less obviously, however, the full development of what is new and characteristic in the normal individual is a matter of high consequence to the community; and this, not only as a means of realising that variety of capacity and task which makes the specialised work of a highly civilised people possible, and as adding enormously to the value of social intercourse; but as securing one of the first conditions of social progress, namely, individual variation considerably beyond the limit of the average attainments of the hour. A time will come when political thinkers and others will look back in astonishment to those features of the school of to-day—the large classes, the stereotyped modes of instruction, *etc.*—which look as if they had been invented, hardly less deliberately than the Jesuit system of education, in order to crush out individuality.

Meanwhile the enlightened teacher must do his best, under the unfavourable conditions, so to modify his modes of instruction and moral training as to adapt them to such differences between child and child as he is able to discover. He may sometimes, even in a large class, select his question for a particular child. Outside the class-room he will lose no opportunity of getting into touch with his pupils so as to know more of their peculiar aptitudes and tastes. Home-work—which can so easily become a

burdensome addition to the day's tasks—may be so arranged as to afford some scope for a child's spontaneous self-expression, and thus to give the teacher valuable hints on individual stocks of ideas, predominant interests, points of view, etc.

Nor is it only in acting upon the intelligence and tastes that the teacher should find room for a salutary adaptation of educational stimulus to individual peculiarities; moral training itself, though it necessarily proceeds in the main by a common plan—explaining and enforcing general rules, holding up great ideals valid for all alike—should be elastic so far as to adapt these presentations to special cases, not only to the peculiar element of *weakness*, but to the peculiar element of *strength*, in this or that boy.

This work of adaptation to individual needs will make heavy demands on the teacher's insight and tact. He will have to see deeply into the human value of this and the other individual trait before he can decide whether, and if so how far, he is to foster it, and how far rather to restrict its development by levelling up other counter-balancing traits. Perhaps his natural tendency is to think too much of "the average child" and to apperceive all strongly marked mental characteristics as eccentricities—things to get rid of, or, at any rate, to tone down. What is wanted is a finely discriminating eye for anything in mental attitude, mode of observation, etc., predominating lines of interest and of effort, which is capable of becoming a valuable constituent of individuality in the later fully developed mind and character.

A deeper appreciation of the worth of individuality will lead the teacher to foster it indirectly by influencing the tone of the school and working against the powerful tendency of the crowd-mind to suppress all divergence from the common pattern of ideas and sentiments.[1] His success here, as elsewhere, will depend largely on his being himself an embodiment of the attitude which he seeks to

[1] On the psychology of the crowd-mind see Le Bon's work, already named, also Mr. Graham Wallas's recent work, *Human Nature in Politics*.

develop in others. The more he impresses his boys as being himself a person of distinguished intelligence and character, and the more he shows himself to be consistently a respecter of individuality in others, the more likely is he to be able to develop in the collective mind of his little community, not only a toleration, but a warm appreciation of all indications of worthy individuality in its members, including the expression of independent views and preferences.

NOTES.

NOTE A (p. 549).—It is this intricate interaction between the development of the intellectual, of the affective, and of the conative process which gives rise to different views with respect to the question, which of the three constituent functions is most fundamental. According to some psychologists conation should be so viewed. Prof. Stout shows a leaning to this view, more particularly in his *Groundwork of Psychology*, when he puts conation before "feeling-attitude" (see p. 19). On the other hand, as pointed out above in the treatment of feeling, there is something to be said for making feeling the primary mode of experience.

NOTE B (p. 555).—The series of works referred to began with an article, "Les Diverses Formes du Caractère," in the *Revue Philosophique* (vol. xxxiv.), by its energetic editor, Prof. Th. Ribot. This led to the publication of the volume, *Les Caractères*, by Fr. Paulhan (1894). Others followed, of which it must suffice to name two, *Tempérament et Caractère*, by Alfred Fouillée (1895), and *Les Eléments du Caractère*, by P. Malapert (1897). The last two show a marked advance in respect of grasp of the complexity of the subject. In addition to these studies on character recent French literature has given us some excellent monographs on special varieties of artistic genius: *e.g.*, *Psychologie du Peintre*, by Lucien Arréat (1892), and *L'Esprit Musical*, by Lionel Dauriac (1904).

NOTE C (p. 571).—This tendency to resolve mental activity into an indefinite number of quasi-atomic processes is carried to an extreme point by Thorndike in his *Educational Psychology*, where he seems to reject everything in the nature of a common type of intellectual process, such as perception, as a fiction born of "barren descriptive psychologies". For these more comprehensive types of process he would substitute "a multitude of functions," namely, "connections between separate sense-stimuli and our separate sensations and judgments thereof". Apparently, our discriminative judgment of a particular shade of colour has nothing to do with our judgment of a particular tone, if indeed it has any relation to our judgment of the contrasting colour. Very naturally, he seeks to find a foundation for this atomistic psychology in a further exaltation of the "nervous arc," telling us

that the nervous system is a multitude of connections between particular happenings in the sense-organ and particular events in the muscles (see especially pp. 28-30). Prof. Thorndike's theory would seem to necessitate a complete revision of the language, not only of psychology, but of neurology. The expression "nervous *system*" would sound strange enough when applied to such a bundle of disconnected arc-units.

NOTE D (p. 576). The subject of Illusion has been touched on in connection with Perception (see pp. 166, 171). The two examples there given, Aristotle's experiment and the illusion of the staircase, illustrate the two chief sources of inaccurate perception or illusion: (1) the influence of unusual circumstances in misleading the interpretative process, and (2) the effect of a strong temporary predisposition (not due to a common rule of experience) to apperceive a thing in a particular way. Thus the illusion in Aristotle's experiment is clearly due to a state of things (the crossed fingers) so unusual that what occurs is for once mis-interpreted through the force of a firmly fixed mode of interpretation: the meaning we give to our sensations would be the right one in ordinary circumstances. These illusions are thus perceptual "catches". In the case of the illusion of the staircase, our ability to see it, now under one aspect, now under another, points to the influence of a distinctly subjective factor, something of the nature of a predisposition. Such falsifications in perception are quite common in normal persons, many passing quite unnoticed—*e.g.*, the constant error in comparing horizontal and vertical length—till experiment drags them into light.

It is otherwise in the case of the illusions of which the pathologist speaks. A familiar experience may illustrate the transition from the normal to the abnormal type. A nervous child, lying in bed, his head full of vague but terrifying possibilities, suddenly "sees" an old woman glowering at him, and only gets over his horror after the household has been summoned by his despairing yells, and when the terrifying object turns out to be the harmless towel and mirror of a washstand. In this case a half-abnormal character is given to the illusion by the circumstance that the amount of falsification in it is excessive and serious, and is due to a disturbed state of the nervous system at the same time. Yet, as Prof. Ziehen tells us,[1] it is only when such illusions occur very frequently, especially in broad daylight, that they indicate a definitely pathological condition.

Hallucinations are commonly marked off from illusions as total falsifications, there being no real object in the environment to correspond with the percept. Thus it is an hallucination when a person "hears" purely imaginary sounds as voices. In most if not all cases, perhaps, there is some amount of "subjective sensation" involved, so that hallucination becomes hardly distinguishable from an extreme case of illusion. Thus, the imaginary voices may have a slender sensuous basis in the "subjective" sensations of sound excited by abnormal conditions in the organ of hearing. However this be, it is evident that, in general, hallucinations are more serious disturbances of normal mental process than illusions. In normal life they are very rare. Hence their appearance in children is a grave symptom, to which the attention of the medical expert should at once be called.[2]

[1] Article "Illusionen" in Rein's *Encykl. Handbuch der Pädagogik.*

[2] On the theory of illusions and hallucinations, see Sully, *Illusions* ("International Scientific Series"); Edmund Parish, *Hallucinations and Illusions*,

("Contemporary Scientific Series"), Ebbinghaus, *Grundzüge der Psychologie*, Zweiter Band, erste Lieferung, Leipzig, Veit, 1908, and Ziehen, article, "Illusionen," in Rein's *Encyklo. Handbuch.*

A useful short account of various kinds of mental abnormality in children will be found in the work of Tracy and Stimpfl referred to in the text, *Psychologie der Kindheit* (2nd edn., 1908). See especially the paragraphs on illus ons, p. 16; disturbances of memory, 41; of imagination, 49-50; of feeling, 71-73; of language, 131-133; of memory and abnormal forms of lying, 149-153; and the whole of the last chapter on the psychopathic element in the life of children.

APPENDIX A.

HEREDITY AND ACQUIRED CHARACTERS (see p. 62).

MODIFICATIONS which arise in an organism as adaptations of the individual to its environment are called *acquired characters*. According to one theory (known as the Lamarckian) acquired characters can be handed on to the offspring; according to another (that of Prof. Weismann) they cannot. Neither theory denies that individual peculiarities can be handed on, for such peculiarities may be due to a connate tendency to vary in a particular way, and these tendencies may certainly be inherited. Thus the exceptionally swift horse is more likely than another to have swift offspring. All that the Weismannian view denies is that that part of the horse's swiftness which is due to special training or exercise can be inherited.

If then certain horses were used only for breeding, the question would be very important. As a matter of fact, where this is the case, as with heavy draught horses, it is not usual to try to increase the strength of breeding stallions by special training. The owner of race horses, on the other hand, has them trained in order to win races themselves; if by so doing he improves the offspring, so much the better, but his direct aim is to improve the parent. Yet it may be most important for him to know if a particular colt will be likely to show the trace of some acquired character of its sire—say viciousness due to ill-treatment. So with the educator. His teaching must aim at improving the child; if this improvement be handed on, well and good; but this fact will not modify his teaching. Yet it is of the utmost value to him to know if the child is likely to develop certain characteristics of its parents. Thus the kind of characteristic for which it is important to be prepared is, for instance, some vice or weakness such as alcoholism or dishonesty, insanity, consumption, and so on; or on the other hand, some special gift such as musical capacity. In these cases, where it is impossible to say how far the parent's peculiarity was due to environment and how far to congenital tendency, the only course is to recognise that there is at least a probability of its reappearance in the child.[1] It may be added that even where we have

[1] From an investigation of the mentally sub-normal children in a school district in Berlin, it appeared that the cause was hereditary in 53 per cent. of the cases (inherited nervous debility 18 per cent., alcoholism 29 per cent., syphilis 6 per cent.); Cassel, *Was lehrt die Untersuchung der geist. minderwertigen Schulkinder im IX. Berliner Schulkreis;* quoted by Lay, *Exp. Did.*, p. 386.

Again: "Out of eighty-three epileptic children at the Salpétrière in Paris, sixty had drunken parents" (Thomson, *Heredity*, p. 276). As these two

control over the cause, as in teaching, we cannot (as pointed out in the text) say how much of the result is due to the stimulus and how much to the pupil's latent aptitude.[1]

This leads up to the theory of *Organic Selection* put forward by Profs. Baldwin, Lloyd Morgan and Osborn. On this view there is in every organism a constant tendency to vary from its present form. On the other hand, this form is that which represents a maximum of adaptation to environment, and the organism is therefore at this point in a state of stable equilibrium, so to say: any marked variation vitiates the adaptation, and is therefore quashed, or "damped" as Prof. Baldwin puts it, by natural selection. Any change in the environment, however, so far destroys the stability of the equilibrium, which will now require a slightly new adaptation of the organism. There will then no longer be any check upon variations in the direction of this new form, and so any tendency there may be to vary in this direction will have free play. If the change of environment is permanent the variation will be repeated by each successive individual, those individuals being favoured in which it is strongest, until at last the tendency to vary in this particular direction becomes really hereditary after having been so only in appearance. Thus, while the theory "abandons the transmission of acquired characters," [2] it asserts "that it is the individual accommodations which set the direction of evolution, that is, which determine it".[3]

To sum up then, the inheritance of acquired characters in a strict sense is regarded by most authorities as not proven: but this conclusion is not of great practical consequence, because (1) in concrete instances it is usually impossible to say how far a particular modification is truly "acquired," and (2) a permanent change of environment may produce *apparently* acquired characters by allowing germinal variations to produce appreciable effects; more especially in the case of man who "has developed around him an external heritage, a social framework of customs and traditions, of laws and institutions, of literature and art—by which results almost equivalent to the organic transmission of certain kinds of modifications may be brought about".[4]

quotations indicate, what is inherited is often general weakness, especially of the nervous system, which may or may not manifest itself in exactly the same form as in the parent.

[1] "Every acquired quality is congenital . . . and every congenital quality is also acquired" (Thomson, *op. cit.*, p. 177): in other words, every quality is the joint product of the internal and external factors (*cf.* above, p. 82).

[2] J. M. Baldwin, *Development and Evolution*, p. 339, quoting from Prof. H. F. Osborn.

[3] Baldwin, *op. cit.*, p. 37. *Cf.* Lloyd Morgan, *Animal Behaviour*, pp. 115 f.

[4] Thomson, *op. cit.*, p. 246.

APPENDIX B.

CAPACITY OF CHILDREN AND ADULTS (see pp. 237, 552).

ALL that has been said with regard to the power of memory, or any other capacity, in children and adults is subject to one serious reservation. The results, such as they are, are all based upon a comparison of children with *educated* adults, that is with *selected* and *trained* adults. If, now, we wish to know how, say, memory develops with maturity, results based on such a comparison can only be valid if we assume that selection and training have no effect. But as we have seen, it is pretty certain that training is *not* without effect in this particular case. Selection also must be of considerable importance; for each type of college and school, and, to some extent, each class in the same school, contains only a selection of the pupils in that below it. Thus the percentages of pupils in the various classes of the schools of Chicago were found to be as follows[1]:—

Grades.							High School.			
2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	1st.	2nd.	3rd.	4th.
100	91	78	71	52	37	26	12	7	5	3

An adult of "university education" is thus one of a selected class, representing only a very small percentage of elementary school children. The overlooking of this fact, which has been called "the fallacy of selection,"[2] vitiates practically all the comparisons, both popular and experimental, of children with adults in respect of mental powers. Before any exact results can be obtained by such comparison, the three factors (1) increasing maturity (development), (2) special training, and (3) selection, must be kept rigidly apart. As this has not been done we must say that "it is doubtful how far we know anything about the changes of mental traits with age".[3] The commonly accepted views are probably much too flattering to the adult. In the case of savages, where training and selection are reduced to a minimum, we are told that children and youths appear more intelligent than adults.[4] *A priori*, it would seem likely that, in a primitive or "natural" state, intelligence should be more necessary during youth, when the various reactions and forms of skill are being acquired, than later when they have mostly become stereotyped.

[1] E. L. Thorndike, *Educational Psychology*, p. 95.
[2] Thorndike, *op. cit.*, chap. ix.
[3] *Ibid.*, p. 104.
[4] Dudley Kidd, *Savage Childhood*, Introduction.

BIBLIOGRAPHY.

[This gives some of the more important recent books, including those which the author has made use of in the revision of the HANDBOOK. For purposes of convenience in reference, they are classified, and the members of each class are arranged in alphabetical order. The books marked by a star are such as will be found specially useful by way of comparison to the student of the HANDBOOK.

I. PSYCHOLOGY.

(*a*) *Works in General Psychology.*

Angell, J. R. *Psychology.* London: Constable, 1905.

Bain, A. *The Senses and the Intellect.* London: Longmans, 1894.

* —— *The Emotions and the Will.* London: Longmans, 1899.

* Baldwin, J. M. *The Story of the Mind.* London: Newnes, 1899.

Brackenbury, L. *A Primer of Psychology.* London: Murray, 1909.

Calkins, M. W. *An Introduction to Psychology.* New York: Macmillan, 1901.

Dewey, J. *Psychology.* New York: Harper, 1893.

Ebbinghaus, H. *Grundzüge der Psychologie.* 2nd edition. Leipzig: Veit, 1905.

* Höffding, H. *Outlines of Psychology.* London: Macmillan, 1892.

James, W. *Principles of Psychology.* New York: Holt, 1890.

* —— *Psychology.* New York: Holt (London: Macmillan), 1892.

Jastrow, J. *Fact and Fable in Psychology.* Boston: Houghton, 1900.

Judd, C. H. *Psychology: General Introduction.* New York: Scribners, 1907.

Kirkpatrick, E. A. *Genetic Psychology.* London: Macmillan, 1909.

Külpe, O. *Outlines of Psychology.* Transl. by E. B. Titchener. London: Sonnenschein, 1895.

Lipps, T. *Leitfaden der Psychologie.* Leipzig, 1903.

Mellone, S. H., and Drummond, M. *Elements of Psychology.* London: Blackwood, 1907.

Mitchell, W. *Structure and Growth of the Mind.* London: Macmillan, 1907.

* Myers, C. S. *Text-Book of Experimental Psychology.* London: Arnold, 1909.

Robertson, G. Croom. *Elements of Psychology.* London: Murray, 1896.

* Royce, J. *Outlines of Psychology.* (Teachers' Professional Library.) London, 1903.

Scripture, E. W. *The New Psychology.* (Contemp. Sci. Series.) London, 1897.

Spencer, Herbert. *Principles of Psychology.* 3rd edition, 1908. London: Williams & Norgate.
Stout, G. F. *Analytic Psychology.* London: Sonnenschein, 1896.
* —— *Groundwork of Psychology.* London: Clive, 1908.
—— *Manual of Psychology.* London: Clive, 1901.
Sully, J. *The Human Mind.* London: Longmans.
* Titchener, E. B. *An Outline of Psychology.* New York, 1896.
—— *Experimental Psychology.* New York: Macmillan, 1901, etc.
—— *Text-book of Psychology,* vol. i. Macmillan, 1909.
* Ward, J. (Article) "Psychology," in the *Encyclopædia Britannica,* 9th edition, vols. xx. and xxxii.
Witmer, Lightner. *Analytical Psychology.* Boston, 1902.
Wundt, W. *Human and Animal Psychology.* London: Sonnenschein, (New York: Macmillan), 1894.
—— *Outlines of Psychology.* Transl. by C. H. Judd. 1902.
—— *Principles of Physiological Psychology.* London: Sonnenschein, 1904, etc.

(*b*) *Works Dealing with Particular Parts of Psychology.*

Allin, A. *The Origin and Function of Habits.* Investigations of the Departments of Psychology and Education: University of Colorado.
Binet, A. *The Psychology of Reasoning.* Transl. by A. G. Whyte. London: Kegan Paul, 1899.
* —— *L'Étude Expérimentale de l'Intelligence.* Paris: Schleicher, 1903.
* —— *La suggestibilité.* Paris: Schleicher, 1900.
Bosanquet, B. *Psychology of the Moral Self.* London: Macmillan, 1897.
Calkins, M. W. "Association." *Psychological Review, Monograph Supplement,* February, 1896.
Colegrove, F. W. *Memory.* New York: Holt, 1900.
Féré, C. S. *Sensation et Mouvement.* Paris, 1887.
—— *Travail et plaisir.* Paris: Alcan, 1904.
Galton, Sir F. *Inquiries into Human Faculty.* Macmillan; (or Dent, Everyman's Library).
Groos, K. *The Play of Man.* Transl. by E. L. Baldwin. New York: Appleton, 1901.
Huey, E. B. *The Psychology of Reading.* New York, 1908.
* Lange, C. *Apperception.* Transl. by G. De Garmo. Boston: Heath, 1896.
McLellan, J. A., and Dewey, J. *The Psychology of Number.* (Internat. Ed. Series, vol. xxxiii.). New York: Appleton, 1895.
Meumann, E. *Intelligenz und Wille.* Leipzig: Quelle u. Meyer, 1908.
Miller, I. E. *Psychology of Thinking.* New York, 1909.
Offner, M. *Das Gedächtnis.* Berlin: Reuther & Reichard, 1909.
Paulhan, F. *L'Activité Mentale et les Elements de l'Esprit.* Alcan: Paris, 1889.
Peterson, Harvey A. "Recall of Words, Objects, and Movements." *Psychological Review: Monograph Supplements,* 1903.
* Pillsbury, W. B. *Attention.* London: Swan Sonnenschein, 1908.
Ribot, Th. A. *Essay on the Creative Imagination.* London: Kegan Paul, 1906.
* —— *The Evolution of General Ideas.* Transl. by F. A. Welby. London: Kegan Paul, 1899.

Ribot, Th. A. *La Logique des Sentiments.* Paris: Alcan, 1905.
—— *Essai sur les Passions.* Paris: Alcan, 1907.
—— *The Psychology of Attention.* London: Longmans, 1890.
—— *The Psychology of the Emotions.* (Contemp. Sci. Series.) London, 1897.
* Stern, L. W. "Über Psychologie der individuellen Differenzen." *Schriften der Gesellschaft für Psycholog. Forschung.* Heft 12, 1900.
Thorndike, E. L. *Theory of Mental and Social Measurements.* New York: The Science Press, 1904.
* Titchener, E. B. *Lectures on the Psychology of Feeling and Attention.* New York: Macmillan, 1908.
Watt, H. J. *The Economy and Training of Memory.* London: Arnold, 1909.

(c) *Works on Child-Psychology.*

Ament, W. *Die Entwickelung von Sprechen und Denken beim Kinde* Leipzig, 1899.
—— *Fortschritte der Kinderseelenkunde.* Leipzig: Engelmann, 1906.
* Binet, A. *Les idées modernes sur les enfants.* Paris: Flammarion, 1909.
Chamberlain, A. F. *The Child.* New York: Scribners, 1900.
* Compayré, G. *The Intellectual and Moral Development of the Child.* (Internat. Ed. Series.) New York: Appleton, 1896.
Cramaussel, E. *Le premier éveil intellectuel de l'enfant.* Paris: Alcan, 1909.
Drummond, W. B. *The Child.* (Temple Primers.) London, 1901.
—— *An Introduction to Child Study.* London: Arnold, 1907.
Georgov, I. A. *Die ersten Anfänge des sprachlichen Ausdrucks für das Selbstbewusstsein bei Kindern.* Leipzig, 1905.
Groos, K. *Das Seelenleben des Kindes.* Berlin: Reuther u. Reichard, 1904.
Hall, G. Stanley. *Adolescence.* New York: Appleton, 1904.
* —— *Youth.* London: Appleton, 1907.
—— *The Contents of Children's Minds on Entering School.* New York: Kellogg, 1883.
Kerschensteiner, G. *Die Entwickelung der Zeichnerischen Begabung.* Munich, 1905.
King, Irving. *Psychology of Child Development.* Chicago University Press, new edition, 1908.
* Kirkpatrick, E. A. *Fundamentals of Child Study.* London: Macmillan, 1903.
Levinstein, S. *Kinderzeichnungen bis zum 14 Lebensjahr.* Leipzig: Voigtländer, 1905.
Major, D. R. *First Steps in Mental Growth.* New York: Macmillan, 1906.
Moore, K. C. "The Development of a Child." *Psych. Review: Monograph Supplement*, No. 3. New York, 1896.
Oppenheim, N. *Development of the Child.* New York: Macmillan, 1899.
Perez, B. *The First Three Years of Childhood.* Transl. by A. M. Christie. London: Sonnenschein, 1885.
* Preyer, W. T. *Mental Development in the Child.* Transl. by H. W. Brown. London: Arnold, 1894.

Preyer, W. T. *The Mind of the Child.* Transl. by W. H. Brown. (Internat. Ed. Series, vols. vii. and ix.) New York: Appleton, 1893; London: Arnold.
Queyrat, F. *L'Imagination et ses varietés chez l'Enfant.* Paris, 1893.
* —— *Les jeux des enfants.* Paris: Alcan, 1905.
Schreiber, A. *Das Buch vom Kinde.* Leipzig: Teubner, 1907.
* Shinn, M. W. *Notes on the Development of a Child.* Berkeley, U.S.A., 1893, 1894.
Sikorsky, I. A. *Die Seele des Kindes.* Leipzig, 1902.
Stern, L. W. *Die Kindersprache.* Leipzig: Barth, 1907.
* Sully, J. *Studies of Childhood.* (New edition), 1903.
Taylor, A. R. *The Study of the Child.* New York: Appleton, 1898.
* Thorndike, E. L. *Notes on Child Study.* New York: Macmillan, 1901.
* Tracy, F. *The Psychology of Childhood.* Boston: Heath, 1894.
—— F., and Stimpfl, J. *Psychologie der Kindheit* (2te Auflage). Leipzig: Wunderlich. 1908.
Urwick, W. E. *The Child's Mind.* London: Arnold, 1907.
Ziehen, Th. *Die Ideenassoziation des Kindes.* Berlin: Reutler u. Reichard, 1900.

II. WORKS IN SCIENCES ALLIED TO PSYCHOLOGY: PHYSIOLOGICAL PSYCHOLOGY, MENTAL PATHOLOGY, AND SCHOOL HYGIENE; BIOLOGY, ANIMAL PSYCHOLOGY, AND SOCIAL PSYCHOLOGY.

Baldwin, J. M. *Development and Evolution.* New York: Macmillan, 1902.
* —— *Mental Development in the Child and in the Race.* London and New York: Macmillan (new edition), 1906.
Binet, A. *Mind and Brain.* London: (International Sci. Series, No. 89), 1907.
—— *Les enfants anormaux.* Paris: Collin.
* —— and Henri, V. *La Fatigue Intellectuelle.* Paris: Schleicher, 1898.
Cavanagh, F. *The Care of the Body.* London: Methuen, 1907.
Clouston, T. S. *Hygiene of Mind.* London: Methuen, 1906.
* Donaldson, H. H. *The Growth of the Brain.* (Contemp. Sci. Series.) London: Scott, 1896.
Dukes, C. *Health at School.* 4th edition. London: Rivingtons, 1905.
Emminghaus, H. *Die psychische Störungen des Kindesalters.* Tübingen: Laupp, 1887.
Foster, Sir M. *A Text-book of Physiology.* 6th edition. London: Macmillan, 1893-1900.
Galton, Sir Francis. *English Men of Science: Their Nature and Nurture.* London: Macmillan, 1874.
Groos, C. *The Play of Animals.* Transl. by E. L. Baldwin. London: Chapman & Hall, 1898.
Heller, T. *Grundriss der Heilpädagogik.* Leipzig: Engelmann, 1904.
Hill, Alexander. *The Body at Work.* London: Arnold, 1908.
—— L. *Manual of Human Physiology.* London: Arnold, 1899.
Hobhouse, L. T. *Mind in Evolution.* London: Macmillan, 1901.
Hoesch-Ernst, L. *Das Schulkind. I. Teil. Anthropometrische Untersuchungen an Schulkindern.* Leipzig: Nemnich, 1906.

Janet, Pierre. *The Major Symptoms of Hysteria.* London: Macmillan, 1907.
Keller, Helen A. *The Story of My Life.* London: Hodder & Stoughton, 1903.
—— *The World I Live In.* London: Hodder & Stoughton, 1908.
Kidd, D. *Savage Childhood.* London: Black, 1906.
Kraepelin, E. *Die Arbeitscurve.* Wundt's *Phil. Studien*, xix., 1902; also separately, Leipzig, 1902.
Ladd, G. T. *Outlines of Physiological Psychology.* London: Longmans, 1891.
Le Bon, G. *The Crowd.* London: Fisher Unwin, 1903.
Lubbock, J. (Baron Avebury). *The Origin of Civilisation.* 6th edition. London: Longmans, 1902.
Mackenzie, W. L. *The Medical Inspection of School Children.* Edinburgh: Hodge, 1904.
* McDougall, W. *Physiological Psychology.* (Temple Primers.) London, 1900.
* —— *Introduction to Social Psychology.* London: Methuen, 1908.
Mercier, C. A. *Psychology Normal and Morbid.* London: Sonnenschein, 1901.
Moll, A. *Hypnotism.* London: Contemp. Sci. Series, 1890.
Morgan, C. Lloyd. *Habit and Instinct.* London: Arnold, 1896.
—— *Animal Behaviour.* London: Arnold, 1900.
Mosso, A. *Fatigue.* Transl. by M. and W. B. Drummond. London: Sonnenschein, 1904.
Münsterberg, H. *Psychology and Crime.* London: Unwin, 1909.
Parez, C. C. Th. "On the Measurement of Mental Fatigue in Germany." *Special Reports on Educational Subjects*, vol. ix. Board of Education, 1897, etc.
Parish, E. *Hallucinations and Illusions.* London: Scott, 1897.
Ribot, Th. *Diseases of Memory.* London: Open Court Publishing Co., 1903.
—— *Diseases of the Will.* London: Open Court Publishing Co., 1903.
Romanes, G. J. *Mental Evolution in Man.* London: Kegan Paul, 1888.
Ross, E. A. *Social Psychology.* New York: Macmillan, 1908.
Stern, C. and W. *Erinnerung, Aussage und Lüge in der ersten Kindheit.* Leipzig: Barth, 1909.
Strohmayer, W. *Vorlesungen über die Psychopathologie des Kindesalters für Mediziner und Pädagogen.* 1909.
Strümpell-Spitzner. *Pädagogische Pathologie.* Leipzig: Ungleich, 1899.
Sully, J. *Illusions.* London: Kegan Paul (new edition), 1906.
Tarde, G. *Les Lois de l'Imitation.* (English transl. by Parsons.) Paris: 1895.
Thompson, H. B. *The Mental Traits of Sex.* Chicago: University Press, 1905.
Thomson, J. A. *Heredity.* (Progressive Science Series.) London, 1908.
Wallas, Graham. *Human Nature in Politics.* London: Constable, 1908.
Ziehen, T. *Geisteskrankheiten des Kindesalters.* Berlin: Reuther u. Reichard, 1906.
—— *Introduction to the Study of Physiological Psychology.* Transl. by Van Liew and Beyer. London, 1892.

III. WORKS ON EDUCATIONAL PSYCHOLOGY, INCLUDING THOSE ON EDUCATION WHICH ILLUSTRATE THE APPLICATION OF PSYCHOLOGICAL PRINCIPLES.

Adams, J. *Exposition and Illustration in Teaching.* London: Macmillan, 1909.

—— *Herbartian Psychology Applied to Education.* London: Isbister, 1897.

—— *Primer on Teaching.* Edinburgh: Clark, 1903.

Adamson, J. W. *The Practice of Instruction.* London: National Society's Depository, 1907.

Adler, F. *The Moral Instruction of Children.* (Internat. Ed. Series.) New York: Appleton, 1892.

Bagley, W. C. *The Educative Process.* New York: Macmillan, 1905.

Bain, A. *Education as a Science.* (Internat. Scientific Series.) London: Kegan Paul, 1879.

Barnes, Earl. "Studies in Education." Stanford Univ., Cal., 1896.

Barth, P. *Die Elemente der Erziehungs- und Unterrichtslehre auf Grund der Psychologie der Gegenwart.* Leipzig: Barth, 1906.

Branford, B. *A Study of Mathematics and Mathematical Education.* Oxford, 1907.

Bryant, S. *Educational Ends.* London: Longmans, 1887.

Butler, N. Murray. *The Meaning of Education.* New York: Macmillan, 1898.

Compayré, G. *L'Adolescence.* Paris: Alcan, 1908.

—— *L'Éducation intellectuelle et morale.* Paris [1908].

—— *Psychology applied to Education.* Transl. by W. H. Payne. New York: Heath, 1895.

—— *J. J. Rousseau and Education from Nature.* Transl. by R. P. Jago. New York: Crowell, 1907.

Darrock, Prof. *The Children.* London: Jack, 1907.

Davidson, J. *A New Interpretation of Herbart's Psychology.* London: Blackwood, 1906.

De Garmo, C. *Principles of Secondary Education.* New York: Macmillan, 1909.

* Dewey, J. *The School and the Child.* London: Blackie, 1906.

—— *The School and Society.* Chicago: University Press, 1899.

Dugas, L. *Le Problème de l'Éducation.* Paris: Alcan, 1909.

Edgeworth, M. *Practical Education.* London, 1815.

Findlay, J. J. *Principles of Class Teaching.* London: Macmillan, 1902.

Fouillée, A. *Education from a National Standpoint.* Transl. by W. J. Greenstreet. London: Arnold, 1892.

Froebel, F. W. A. *Education by Development.* Transl. by J. Jarvis. (Internat. Ed. Series.) London: Arnold, 1899.

—— *Education of Man.* Transl. by W. N. Hailman. (Internat. Ed. Series.) New York; London: Arnold, 1887.

Gould, F. J. *The Children's Book of Moral Lessons.* London: Watts, 1899-1907.

* Guyau, J. M. *Education and Heredity.* Transl. by W. J. Greenstreet. (Contemp. Science Series.) London, 1891.

Hall, G. Stanley. *Aspects of Child Life and Education.* Boston: Ginn, 1907.

Harris, W. T. *Psychologic Foundations of Education.* New York: Appleton, 1898.
Hayward, F. H. *The Primary Curriculum.* London: Ralph, Holland, 1909.
—— *The Secret of Herbart.* London: Watts & Co., 1907.
Herbart, J. F. *The Science of Education.* Transl. by H. M. and E. Felkin. London: Sonnenschein, 1892.
—— *Outlines of Educational Doctrine.* Transl. by A. F. Lange. New York: Macmillan, 1904.
Herford, W. H. *The Student's Froebel.* London: Isbister, 1893.
Horne, H. H. *The Psychological Principles of Education.* New York: Macmillan, 1906.
—— *The Philosophy of Education.* London: Macmillan, 1908.
Jahn, M. *Psychologie als Grundwissenschaft der Pädagogik,* 5te Auflage, 1907.
* James, W. *Talks to Teachers on Psychology and Life's Ideals.* New York: Holt, 1899.
* Judd, C. H. *Genetic Psychology for Teachers.* (Internat. Ed. Series.) London: Arnold, 1903.
Keatinge, M. W. *Suggestion in Education.* London: Black, 1907.
Lay, W. A. *Experimentelle Didaktik.* Wiesbaden, 1903; Leipzig, 1905.
—— *Experimentelle Pädagogik.* Leipzig: Teubner, 1908.
Le Bon, Gustave. *Psychologie de l'Éducation.* Paris: Flammarion, 1902.
Locke, J. *How to bring up your Children. Being some Thoughts on Education.* London: Sampson Low, 1902.
Mackenzie, M. *Hegel's Educational Theory and Practice.* London: Sonnenschein, 1908.
Macmillan, M. *Education Through the Imagination.* London: Sonnenschein, 1904.
McCunn, J. *The Making of Character.* Cambridge: University Press, 1900.
Messmer, O. *Grundlinien zur Lehre von den Unterrichtsmethoden.* Leipzig: Teubner, 1905.
—— *Kritik der Lehre von der Unterrichtsmethode.* Leipzig: Teubner, 1905.
* Meumann, E. *Vorlesungen zur Einführung in die Experimentelle Pädagogik.* Leipzig: Engelmann, 1907.
Morgan, C. Lloyd. *Psychology for Teachers.* London: Arnold, 1906.
Münch, W. *Zukunftspädagogik.* Berlin: Reimer, 1904.
Münsterberg, H. *Psychology and Life.* London: Constable, 1899.
—— *Psychology and the Teacher.* New York and London: Appleton, 1909.
O'Shea, M. V. *Education as Adjustment.* London: Longmans, 1908.
—— *Dynamic Factors in Education.* New York: Macmillan, 1906.
Payne, W. H. *Contributions to the Science of Education.* New York: Harper, 1886.
Pfeiffer, L. *Ueber Vorstellungstypen* (Pädagogische Monographien II. Band). Leipzig: Nemnich, 1907.
—— *Experimentelle Untersuchungen über qualitative Arbeitstypen* (Pädagogische Monographien V. Band). Leipzig: Nemnich, 1908
Pfisterer, G. F. *Pädagogische Psychologie.* Gütersloh, 1880.

Queyrat, F. *La Logique chez l'Enfant et sa Culture.* Paris (Bib. de Phil. Contemp.), 1902.
Radossawljewitsch, P. R. *Das Behalten und Vergessen bei Kindern und Erwachsenen nach experimentellen Untersuchungen* (Pädagogische Monographien I. Band). Leipzig: Nemnich, 1907.
Raymont, T. *The Principles of Education.* London: Longmans, 1904.
Rein, W. *Outlines of Pedagogics.* Transl. by C. C. and I. J. van Liew. London: Sonnenschein, 1899.
—— *Encyclopädisches Handbuch der Pädagogik.* Langensalza, 1902, etc.
Sallwürk, E. von. *Die didaktischen Normalformen.* Frankfurt-a-M., 1904.
Sidgwick, A. *On Stimulus.* Cambridge, 1888.
Spencer, Herbert. *Education,* London: Williams & Norgate.
Stratton, G. M. *Experimental Psychology and Culture.* New York: Macmillan, 1903.
Thomas, P. F. *L'Education des Sentiments.* Paris, 1899.
—— *La Suggestion. Son Rôle dans l'Education.* Paris (Bib. de Phil. Contemp.), 1903.
Thorndike, E. L. *Educational Psychology.* New York: The Science Press, 1903.
—— *Principles of Teaching based on Psychology.* New York: Seiler, 1906.
Tompkins, A. *The Philosophy of Teaching.* Boston: Ginn & Co., 1899.
Vincent, G. E. *The Social Mind and Education.* London: Macmillan, 1897.
Welton, J. *Logical Bases of Education.* London: Macmillan, 1899.
—— *Principles and Methods of Teaching.* London: Clive, 1906.
—— and Blandford, F. G. *Principles and Methods of Moral Training, with Special Reference to School Discipline.* London: Clive, 1909.
Wimms, J. H. *An Introduction to Psychology for the use of Teachers.* London: Charles & Dible, 1908.
Winch, W. H. *Notes on German Schools.* London: Longmans, 1904.
—— *Problems in Education.* London: Sonnenschein, 1900.

IV. REFERENCES TO ARTICLES IN SCIENTIFIC PERIODICALS, MORE PARTICULARLY TO THOSE MADE USE OF IN THE REVISION OF THE HANDBOOK.

Binet (editor). *L'année Psychologique.*
—— A., and Simon, Th. "Le développement de l'intelligence chez les enfants." *L'année Psychologique,* 1908.
Bolton, F. L. "The Growth of Memory in School Children." *American Journal of Psychology,* vol. v., 1892.
Book, W. F. "The Psychology of Skill." *University of Montana Bulletin,* 1908.
Bradley, F. H. "On Floating Ideas and the Imaginary." *Mind,* N.S., No. 60, pp. 445 ff.
Brown, W. "Some Experimental Results in Correlation." *Proceedings of Sixth International Congress of Psychology,* Geneva (1909).
Bryan, W. L., and Harter, N. "Studies in the Physiology and Psychology of the Telegraphic Language." *Psychological Review,* vols. iv. and vi.

Burnham, W. H. "The Hygiene and Psychology of Spelling," in *The Pedagogical Seminary*, December, 1906.
Cattell, J. M. "Tests of the Senses and Faculties." *Amer. Educational Review*, 1893.
Colvin, S. S., and Meyer, J. F. "Imaginative Elements in the Written Work of School Children," in *The Pedagogical Seminary*, March, 1906.
Ebbinghaus, H. "Ueber eine neue Methode zur Prüfung geistiger Fähigkeiten und ihre Anwendung bei Schulkindern." *Zeitschr. für Psych. u. Phys. der Sinnesorgane*, xiii., 1897.
Förster, F. W. "Zur Methodik des Ethischen Unterrichts." Papers on Moral Education: First International Moral Education Congress, 1908.
* Foster, Sir M. "Weariness." *Nineteenth Century*, September, 1893.
Jacobs, J. "Experiments on Prehension." *Mind*, XII.
Janet, Pierre. "Mental Pathology." *Psychological Review*, March, May, 1905.
Kennedy, F. "On the Experimental Investigation of Memory." *Psychological Review*, vol. v., p. 477 (with bibliography).
Kirkpatrick, E. A. "The Development of Voluntary Movement." *Psychological Review*, 1899.
Kraepelin (editor). *Psychologische Arbeiten.*
Krüger, F., and Spearman, C. "Die Korrelation zwischen verschiedenen geistigen Fähigkeiten." *Zeitschrift für Psychologie*, etc., 1906.
Lipmann, Otto. "Wirkung von Suggestivfragen." *Zeitschrift für angewandte Psychologie.* Band i.
Lobsien, M. "Experimentelle Untersuchungen über Gedächtnisentwickelung bei Schulkindern." *Zeitschrift für Psychologie und Physiologie*, vol. xxvii. 1901.
MacDougall, R. "Fatigue." *Psychological Review*, 1899.
McDougall, W. "Fatigue." *British Association Reports* (for 1908). London: Murray, 1909.
Messmer, O. "Zur Psychologie des Lesens bei Kindern und Erwachsenen." *Archiv für die gesamte Psychologie.* Bd. ii., Heft 2.
Müller und Schumann. "Experimentelle Beiträge zur Untersuchung des Gedächtnisses." *Zeitschrift für Psychologie*, etc. Bd. vi., 1894.
—— und Pilzecker. "Experimentelle Beiträge zur Lehre vom Gedächtnis." *Zeitschrift für Psychologie*, etc. Ergänzungsband, i., 1900.
Netschajeff, A. "Experimentelle Untersuchungen über Gedächtnisentwickelung bei Schulkindern." *Zeitschr. für Psych. u. Phys.*, vol. xxiv., 1900.
Pentschew, C. "Untersuchungen zur Ökonomie und Technik des Lernens." *Archiv für die gesamte Psychologie*, Bd. i., Heft 4.
* Ribot, Th. "L'antipathie." *Revue Philosophique*, November, 1908.
—— "La Conscience Affective." *Revue Philosophique*, April, 1909.
* Shand, A. F. "Character and the Emotions." *Mind*, N.S., V., p. 203.
—— "M. Ribot's Theory of the Passions." *Mind*, XVI., p. 477.
Spearman, C. "General Intelligence Objectively Determined and Measured." *American Journal of Psychology*, vol. xv., 1904.
—— "Footrule for Measuring Correlation." *British Journal of Psychology*, vol. ii., 1906.
Stern, W. "Tatsachen und Ursachen der seelischen Entwicklung." *Zeitschrift für angewandte Psychologie.* Band i. (Hefte 1, 2).

Stern, L. W. *Beiträge zur Psychologie der Aussage.* Leipzig: Barth, 1905, etc.

Thorndike, E. L. "Animal Intelligence." *Psychological Review: Monograph Supplement*, vol. ii., No. 4.

Winch, W. H. "Psychology and Philosophy of Play." *Mind*, N.S., XV., January, 1906.

Wundt (editor). *Psychologische Studien.*

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